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Report No.: SZEM170300249702
Page: 1 of 142

TEST REPORT

Application No.: SZEM1703002497CR
Applicant: GUANGDONG CHEERSON HOBBY TECHNOLOGY CO., LTD
Address of Applicant: Fengxin No. 2 Road & Laimei Road, Fengxin Industrial Zone, Chenghai, Shantou, Guangdong province, China
Manufacturer: GUANGDONG CHEERSON HOBBY TECHNOLOGY CO., LTD
Address of Manufacturer: Fengxin No. 2 Road & Laimei Road, Fengxin Industrial Zone, Chenghai, Shantou, Guangdong province, China
Factory: GUANGDONG CHEERSON HOBBY TECHNOLOGY CO., LTD
Address of Factory: Fengxin No. 2 Road & Laimei Road, Fengxin Industrial Zone, Chenghai, Shantou, Guangdong province, China
Equipment Under Test (EUT):
EUT Name: UFO
Model No.: CX-17, CX-17W, CX-17S, CX-17-TX, CX-18, CX-117, CX-95W, CX-95, CX-95S, CX-90, CX-19, CX-20, CX-22, CX-23, CX-32, CX-32W, CX-32S, CX-32C, CX-33, CX-33W, CX-33C, CX-33S, CX-30, CX-30C, CX-30W, CX-30W-TX, CX-30S, TINY95, TINY90, TINY93, CX-93, CX-93C, CX-93W, CX-93S, CX-96, CX-98, CX-97, CX-70, CX-23 ♣
♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID: 2AD6LGC032417
Standards: 47 CFR Part 15, Subpart C 15.247
Date of Receipt: 2017-03-30
Date of Test: 2017-04-03 to 2017-04-13
Date of Issue: 2017-04-19

Test Result :	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2017-04-19		Original

Authorized for issue by:				
Tested By				2017-04-13
		Bill Chen /Project Engineer		Date
Checked By				2017-04-19
		Eric Fu /Reviewer		Date

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1.2	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.4	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass

Remark:

Model No.: CX-17, CX-17W, CX-17S, CX-17-TX, CX-18, CX-117, CX-95W, CX-95, CX-95S, CX-90, CX-19, CX-20, CX-22, CX-23, CX-32, CX-32W, CX-32S, CX-32C, CX-33, CX-33W, CX-33C, CX-33S, CX-30, CX-30C, CX-30W, CX-30W-TX, CX-30S, TINY95, TINY90, TINY93, CX-93, CX-93C, CX-93W, CX-93S, CX-96, CX-98, CX-97, CX-70, CX-23

Only the model CX-17 was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, only different on model name.



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4 General Information

4.1 Details of E.U.T.

Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n (HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels
Channels Step:	5MHz step
Sample Type:	Mobile production
Antenna Type:	2dBi
Antenna Gain:	Integral
Power supply:	Rechargeable battery: DC 3.7V 400mAh 1.5Wh(Charge by adapter)



Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel(802.11n HT40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2422MHz	3	2432MHz	5	2442MHz	7	2452MHz
2	2427MHz	4	2437MHz	6	2447MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

For 802.11n (HT40):

Channel	Frequency
The Lowest channel	2422MHz
The Middle channel	2437MHz
The Highest channel	2452MHz

4.2 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Laptop	Lenovo	T430u
Test board	Supply to SGS	FT232

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 10 ⁻⁸
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
9	Temperature test	1 °C
10	Humidity test	3%
11	Supply voltages	1.5%
12	Time	3%



4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Minimum 6dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Power Spectrum Density					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Conducted Spurious Emissions					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

Conducted Band Edges Measurement					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09



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General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2016-05-18	2017-05-18

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247

6.1.2 Conclusion

Standard Requirement:

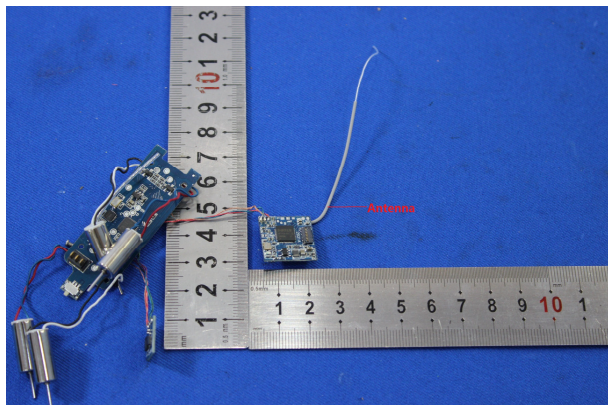
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2dBi.





7 Radio Spectrum Matter Test Results

7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)

Test Method: ANSI C63.10 (2013) Section 11.9.1.2

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

7.1.1 E.U.T. Operation

Operating Environment:

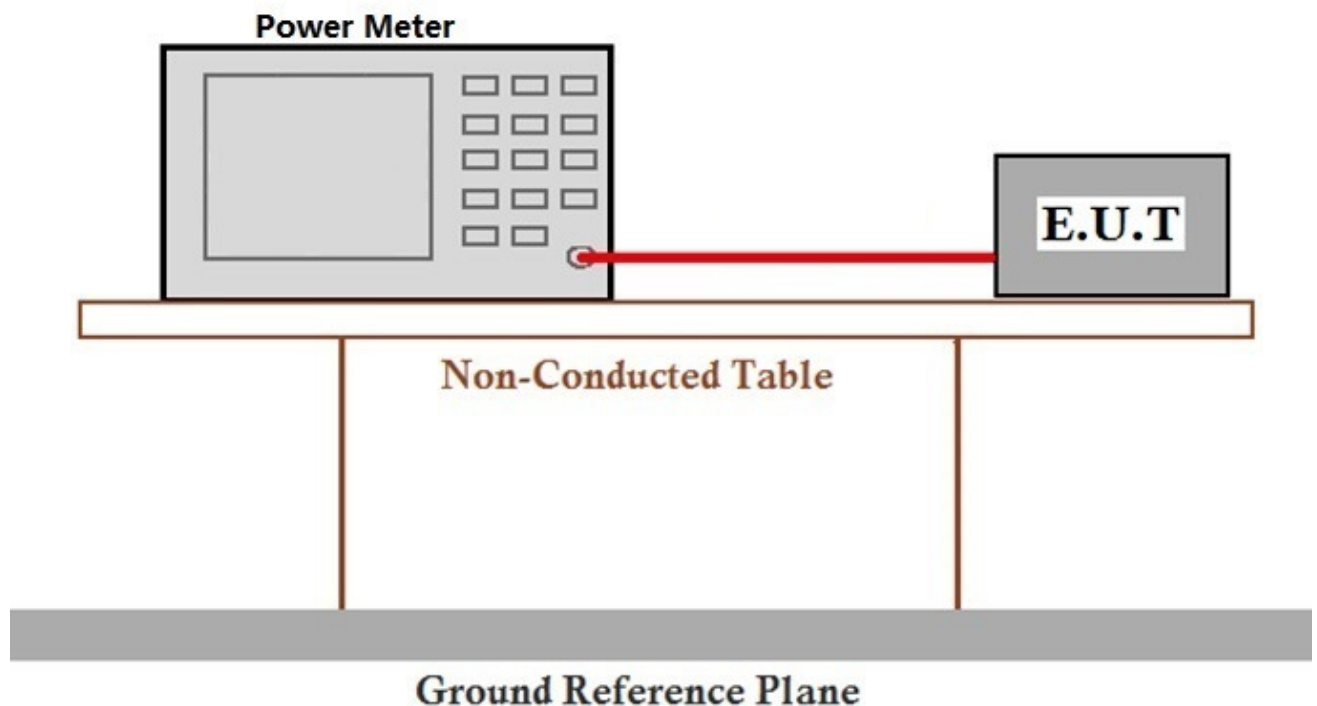
Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test Mode: Transmitting with all kind of modulations, data rates

Final Test Mode: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;

6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.1.2 Test Setup Diagram



7.1.3 Measurement Data

The detailed test data see: Appendix 15.247

7.2 Minimum 6dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.247a(2)
Test Method:	ANSI C63.10 (2013) Section 11.8.1
Limit:	≥ 500 kHz

7.2.1 E.U.T. Operation

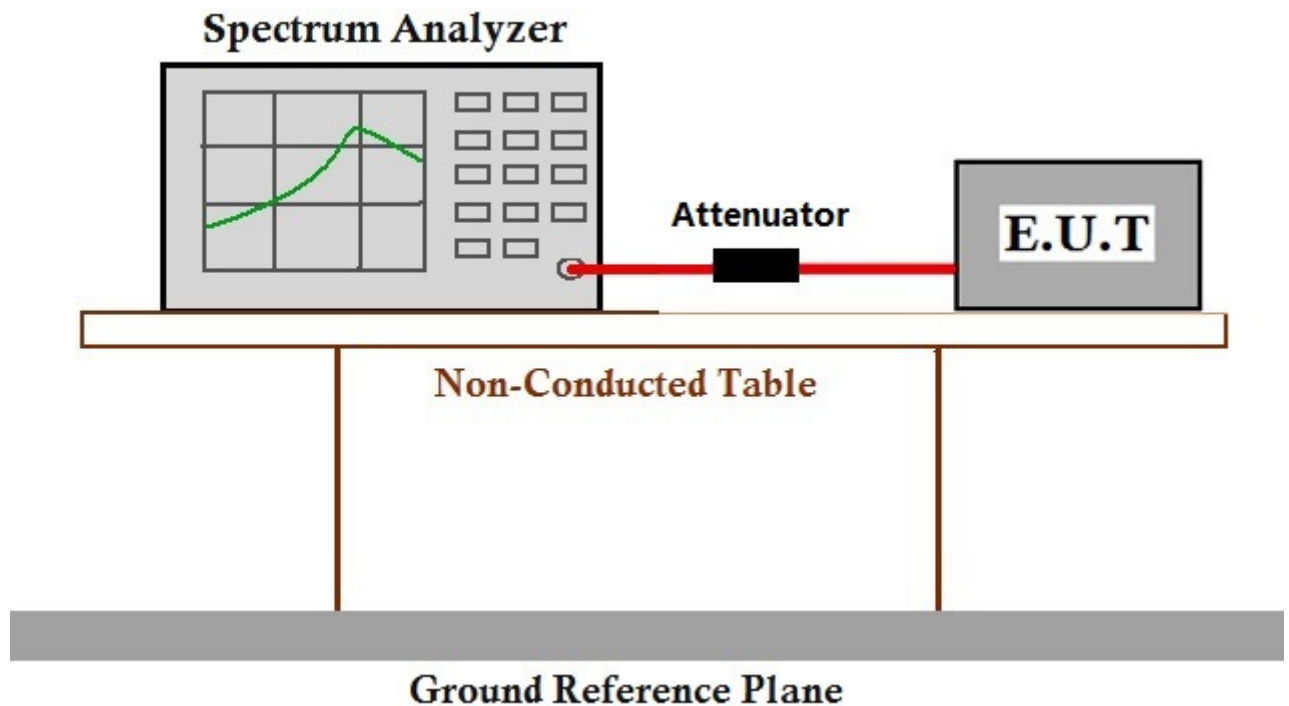
Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test Mode: Transmitting with all kind of modulations, data rates

Final Test Mode: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.2.2 Test Setup Diagram



7.2.3 Measurement Data

The detailed test data see: Appendix 15.247

7.3 Power Spectrum Density

Test Requirement	47 CFR Part 15, Subpart C 15.247(e)
Test Method:	ANSI C63.10 (2013) Section 11.10.2
Limit:	$\leq 8\text{dBm}$ in any 3 kHz band during any time interval of continuous transmission

7.3.1 E.U.T. Operation

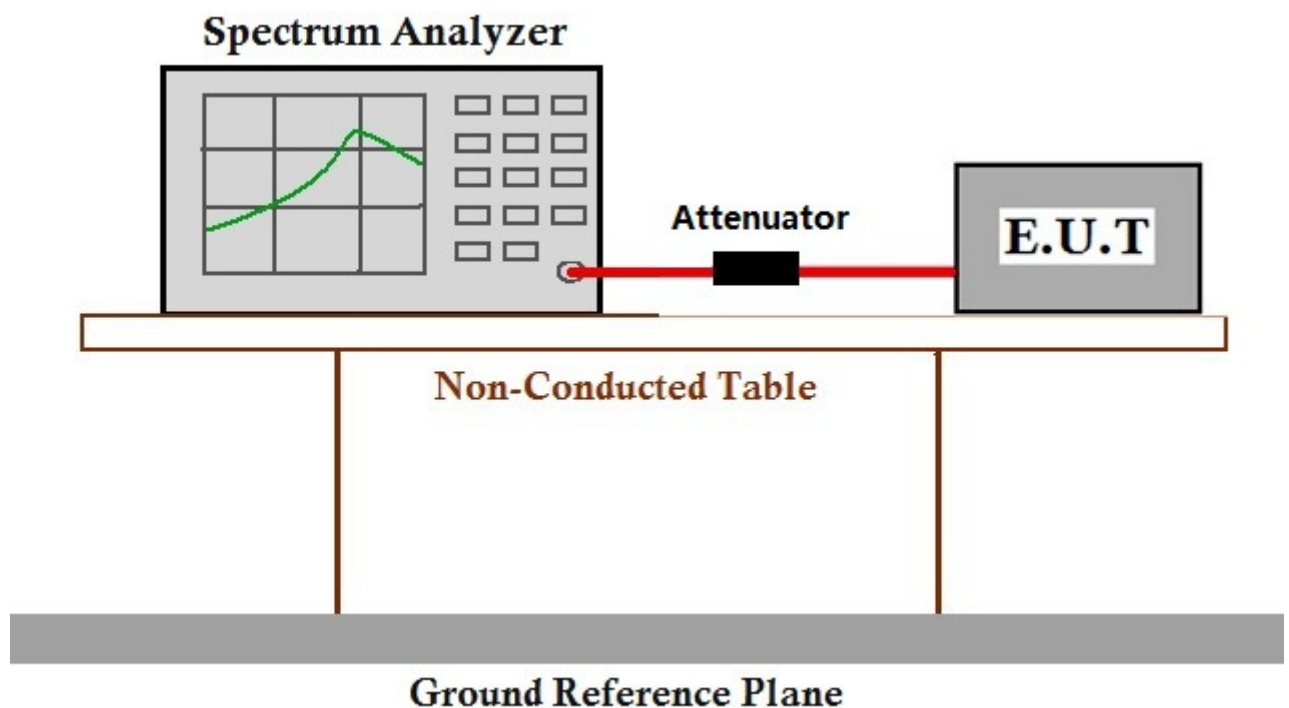
Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test Mode: Transmitting with all kind of modulations, data rates

Final Test Mode: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.3.2 Test Setup Diagram



7.3.3 Measurement Data

The detailed test data see: Appendix 15.247

7.4 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.11
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

7.4.1 E.U.T. Operation

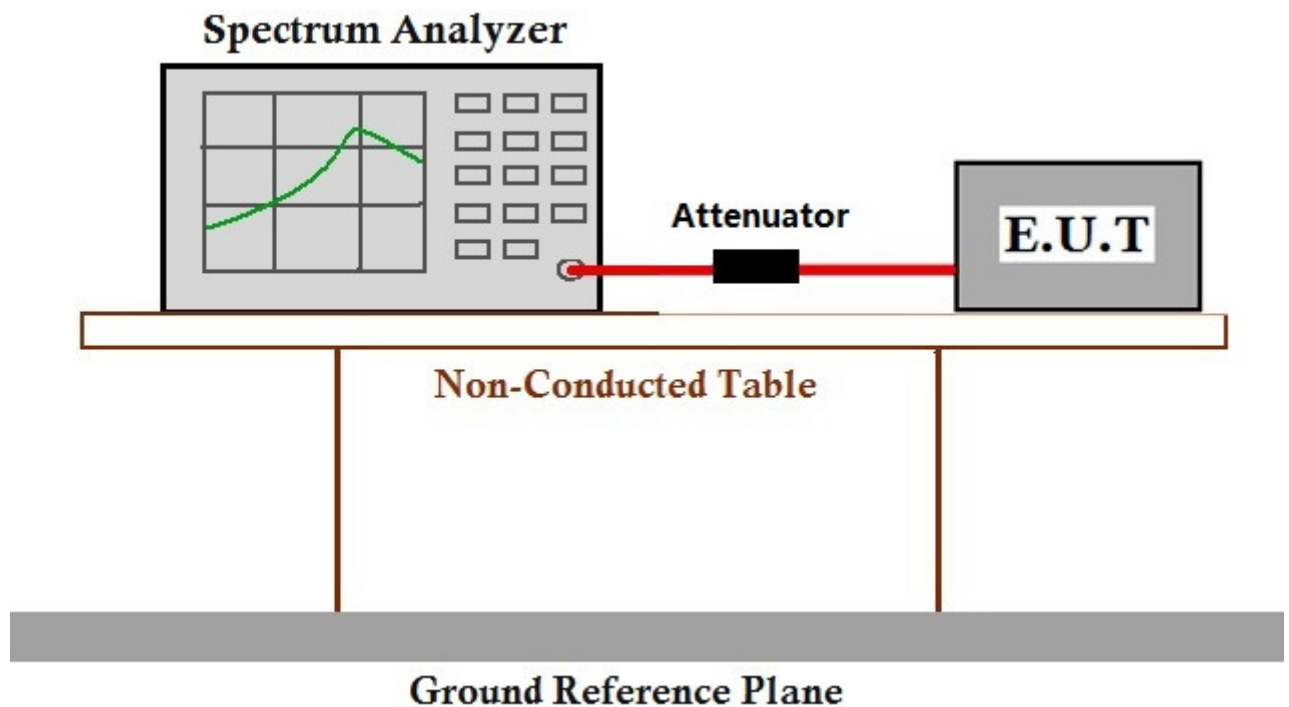
Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1020 mbar

Test Mode: Transmitting with all kind of modulations, data rates

Final Test Mode: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.4.2 Test Setup Diagram



7.4.3 Measurement Data

The detailed test data see: Appendix 15.247



7.5 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.10.4

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.5.1 E.U.T. Operation

Operating Environment:

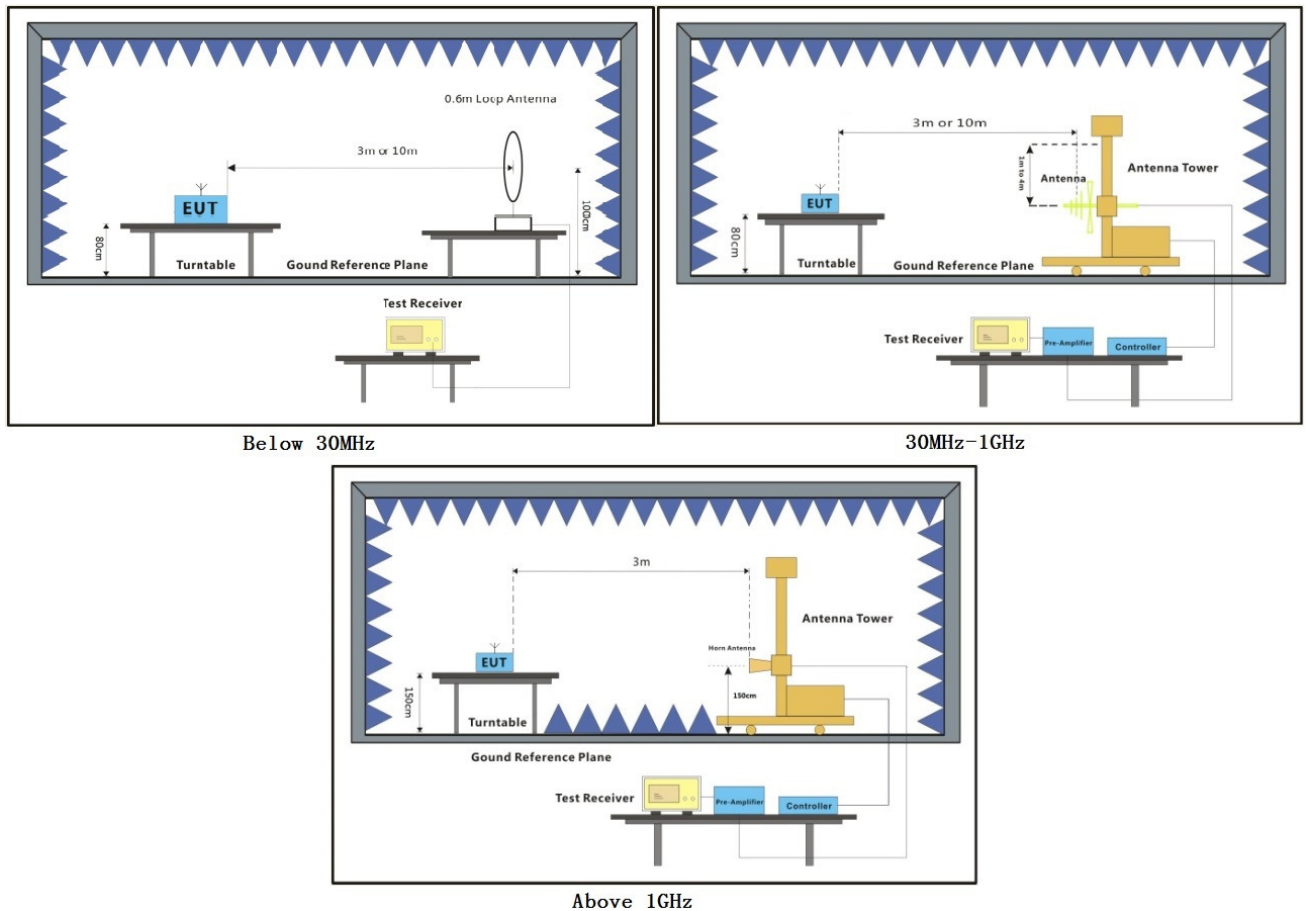
Temperature: 25.0 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test Mode: Transmitting with all kind of modulations, data rates

Final Test Mode: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;

6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

7.5.2 Test Setup Diagram





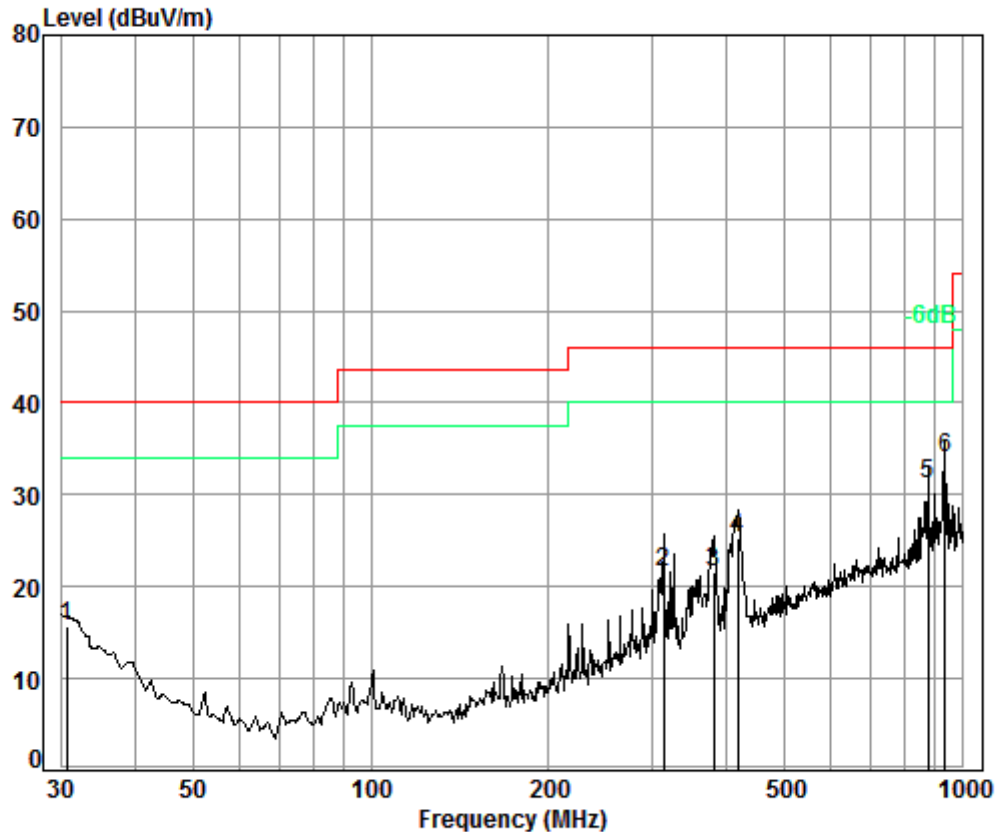
7.5.3 Measurement Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.



30MHz~1GHz

Mode:a ; Horizontal



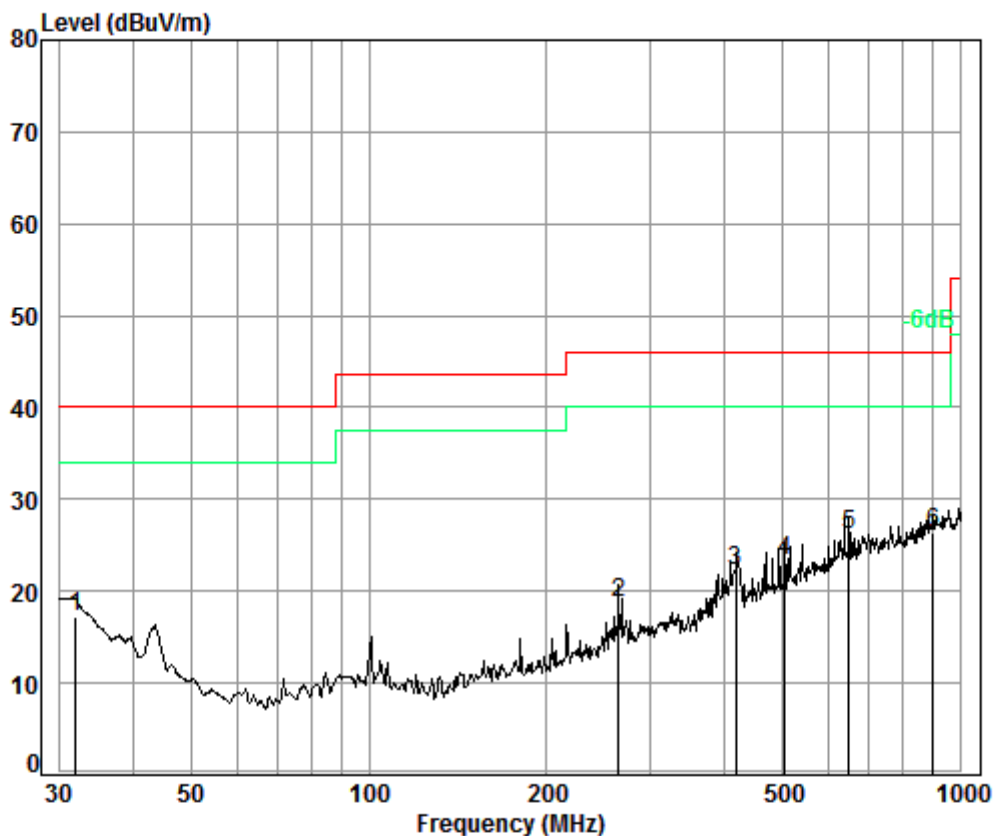
Condition: 3m HORIZONTAL

Job No. : 02497CR

Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.64	0.60	18.34	27.35	24.17	15.76	40.00	-24.24
2	312.18	1.94	14.34	26.50	31.87	21.65	46.00	-24.35
3	379.91	2.15	16.06	27.01	30.28	21.48	46.00	-24.52
4	416.18	2.27	16.36	27.23	33.95	25.35	46.00	-20.65
5	875.25	3.51	23.00	26.89	31.52	31.14	46.00	-14.86
6 pp	935.55	3.64	23.30	26.61	33.57	33.90	46.00	-12.10

Mode:a ; Vertical



Condition: 3m VERTICAL

Job No. : 02497CR

Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	31.95	0.60	17.61	27.35	26.42	17.28	40.00	-22.72
2	263.82	1.74	12.58	26.50	30.84	18.66	46.00	-27.34
3	417.64	2.28	16.37	27.25	30.83	22.23	46.00	-23.77
4	504.71	2.61	17.93	27.69	30.38	23.23	46.00	-22.77
5	647.39	2.80	20.59	27.48	30.29	26.20	46.00	-19.80
6 pp	900.15	3.60	23.20	26.78	26.40	26.42	46.00	-19.58



Above 1GHz

Mode:a; Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1597.181	26.24	4.59	38.04	48.11	41.39	74	-32.61
2871.934	30.85	5.81	37.91	44.38	44.78	74	-29.22
4824.000	34.18	7.75	38.41	43.50	47.41	74	-26.59
7236.000	36.40	9.68	37.08	42.24	51.49	74	-22.51
9648.000	37.53	11.09	35.08	38.16	52.15	74	-21.85
14618.170	40.62	14.75	38.94	36.77	53.77	74	-20.23

Mode:a; Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1199.726	24.48	4.08	38.08	53.82	44.75	74	-29.25
1921.727	27.52	4.94	38.01	45.77	41.22	74	-32.78
4824.000	34.18	7.75	38.41	42.52	46.43	74	-27.57
7236.000	36.40	9.68	37.08	42.14	51.39	74	-22.61
9648.000	37.53	11.09	35.08	38.36	52.35	74	-21.65
13211.690	38.71	13.68	38.21	38.92	53.53	74	-20.47



Mode:a; Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1199.726	24.48	4.08	38.08	52.13	43.06	74	-30.94
1597.181	26.24	4.59	38.04	48.11	41.39	74	-32.61
4874.000	34.28	7.83	38.44	42.65	46.73	74	-27.27
7311.000	36.38	9.72	37.03	42.71	52.02	74	-21.98
9748.000	37.55	11.20	35.02	38.14	52.33	74	-21.67
14408.430	40.18	14.70	38.96	36.55	53.03	74	-20.97

Mode:a; Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1597.181	26.24	4.59	38.04	46.67	39.95	74	-34.05
3168.500	31.62	6.06	37.92	44.76	45.17	74	-28.83
4874.000	34.28	7.83	38.44	41.34	45.42	74	-28.58
7311.000	36.38	9.72	37.03	41.43	50.74	74	-23.26
9748.000	37.55	11.20	35.02	38.63	52.82	74	-21.18
14660.480	40.69	14.76	38.93	36.84	53.93	74	-20.07



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Mode:a; Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1199.726	24.48	4.08	38.08	51.49	42.42	74	-31.58
1921.727	27.52	4.94	38.01	48.69	44.14	74	-29.86
3376.523	31.99	6.21	37.94	44.15	44.98	74	-29.02
4924.000	34.38	7.90	38.47	43.52	47.75	74	-26.25
7386.000	36.34	9.78	36.95	41.76	51.15	74	-22.85
9848.000	37.57	11.28	34.98	38.15	52.48	74	-21.52

Mode:a; Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1601.804	26.26	4.59	38.04	48.34	41.64	74	-32.36
3196.094	31.67	6.08	37.92	45.64	46.11	74	-27.89
4924.000	34.38	7.90	38.47	44.57	48.80	74	-25.20
7386.000	36.34	9.78	36.95	41.85	51.24	74	-22.76
9848.000	37.57	11.28	34.98	38.33	52.66	74	-21.34
13717.560	38.86	14.32	38.72	38.39	53.33	74	-20.67



Mode:a; Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1597.181	26.24	4.59	38.04	46.53	39.81	74	-34.19
3650.582	32.64	6.43	37.97	44.32	45.94	74	-28.06
4824.000	34.18	7.75	38.41	43.59	47.50	74	-26.50
7236.000	36.40	9.68	37.08	43.30	52.55	74	-21.45
9648.000	37.53	11.09	35.08	38.55	52.54	74	-21.46
12290.700	38.78	12.83	36.30	37.97	53.95	74	-20.05

Mode:a; Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1439.343	25.56	4.40	38.06	44.93	37.31	74	-36.69
3159.355	31.60	6.05	37.92	44.56	44.94	74	-29.06
4824.000	34.18	7.75	38.41	43.21	47.12	74	-26.88
7236.000	36.40	9.68	37.08	42.27	51.52	74	-22.48
9648.000	37.53	11.09	35.08	38.60	52.59	74	-21.41
15221.820	41.34	15.03	38.66	35.40	53.70	74	-20.30



Mode:a; Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1503.119	25.81	4.47	38.05	43.67	36.38	74	-37.62
3515.957	32.25	6.31	37.95	43.79	44.93	74	-29.07
4874.000	34.28	7.83	38.44	42.23	46.31	74	-27.69
7311.000	36.38	9.72	37.03	40.66	49.97	74	-24.03
9748.000	37.55	11.20	35.02	37.85	52.04	74	-21.96
14079.080	39.39	14.61	38.99	38.02	53.55	74	-20.45

Mode:a; Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1542.733	26.00	4.52	38.05	44.13	37.09	74	-36.91
3703.723	32.79	6.47	37.97	43.89	45.69	74	-28.31
4874.000	34.28	7.83	38.44	42.99	47.07	74	-26.93
7311.000	36.38	9.72	37.03	42.81	52.12	74	-21.88
9748.000	37.55	11.20	35.02	38.73	52.92	74	-21.08
14201.690	39.69	14.64	38.98	37.71	53.60	74	-20.40



Mode:a; Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1439.343	25.56	4.40	38.06	46.47	38.85	74	-35.15
3069.345	31.43	5.98	37.91	43.97	44.39	74	-29.61
4924.000	34.38	7.90	38.47	42.97	47.20	74	-26.80
7386.000	36.34	9.78	36.95	41.79	51.18	74	-22.82
9848.000	37.57	11.28	34.98	38.61	52.94	74	-21.06
13757.270	38.91	14.36	38.76	38.67	53.67	74	-20.33

Mode:a; Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1533.841	25.96	4.51	38.05	43.52	36.42	74	-37.58
3318.471	31.89	6.17	37.93	44.68	45.40	74	-28.60
4924.000	34.38	7.90	38.47	43.49	47.72	74	-26.28
7386.000	36.34	9.78	36.95	41.65	51.04	74	-22.96
9848.000	37.57	11.28	34.98	38.44	52.77	74	-21.23
14325.370	39.99	14.68	38.97	36.83	53.08	74	-20.92



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1762.112	26.92	4.77	38.02	49.43	43.71	74	-30.29
3703.723	32.79	6.47	37.97	43.54	45.34	74	-28.66
4824.000	34.18	7.75	38.41	41.97	45.88	74	-28.12
7236.000	36.40	9.68	37.08	41.89	51.14	74	-22.86
9648.000	37.53	11.09	35.08	38.07	52.06	74	-21.94
14201.690	39.69	14.64	38.98	37.28	53.17	74	-20.83

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1597.181	26.24	4.59	38.04	47.86	41.14	74	-32.86
3608.619	32.52	6.39	37.96	43.38	44.85	74	-29.15
4824.000	34.18	7.75	38.41	43.37	47.28	74	-26.72
7236.000	36.40	9.68	37.08	42.64	51.89	74	-22.11
9648.000	37.53	11.09	35.08	38.60	52.59	74	-21.41
12219.850	38.73	12.73	36.13	37.11	53.14	74	-20.86



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1282.193	24.87	4.20	38.07	42.13	33.61	74	-40.39
3096.075	31.48	6.01	37.91	42.32	42.72	74	-31.28
4874.000	34.28	7.83	38.44	42.57	46.65	74	-27.35
7311.000	36.38	9.72	37.03	41.89	51.20	74	-22.80
9748.000	37.55	11.20	35.02	37.93	52.12	74	-21.88
15398.830	41.38	15.17	38.46	34.58	53.26	74	-20.74

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1199.726	24.48	4.08	38.08	49.36	40.29	74	-33.71
3177.672	31.64	6.07	37.92	44.85	45.28	74	-28.72
4874.000	34.28	7.83	38.44	42.27	46.35	74	-27.65
7311.000	36.38	9.72	37.03	41.70	51.01	74	-22.99
9748.000	37.55	11.20	35.02	37.91	52.10	74	-21.90
14660.480	40.69	14.76	38.93	36.29	53.38	74	-20.62



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1592.571	26.22	4.58	38.04	41.18	34.43	74	-39.57
3405.929	32.04	6.23	37.94	41.57	42.46	74	-31.54
4924.000	34.38	7.90	38.47	43.74	47.97	74	-26.03
7386.000	36.34	9.78	36.95	41.81	51.20	74	-22.80
9848.000	37.57	11.28	34.98	38.07	52.40	74	-21.60
14366.840	40.08	14.69	38.96	37.57	53.93	74	-20.07

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1601.804	26.26	4.59	38.04	46.63	39.93	74	-34.07
2956.155	31.15	5.89	37.90	41.95	42.43	74	-31.57
4924.000	34.38	7.90	38.47	44.03	48.26	74	-25.74
7386.000	36.34	9.78	36.95	41.85	51.24	74	-22.76
9848.000	37.57	11.28	34.98	38.65	52.98	74	-21.02
12541.900	38.89	13.16	36.90	37.81	53.56	74	-20.44



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1439.343	25.56	4.40	38.06	45.73	38.11	74	-35.89
3078.229	31.45	5.99	37.91	42.71	43.12	74	-30.88
4844.000	34.23	7.79	38.42	43.74	47.74	74	-26.26
7266.000	36.39	9.69	37.06	41.84	51.11	74	-22.89
9688.000	37.54	11.15	35.05	38.44	52.53	74	-21.47
13797.090	38.96	14.40	38.80	38.33	53.38	74	-20.62

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1601.804	26.26	4.59	38.04	48.86	42.16	74	-31.84
3016.575	31.33	5.94	37.90	44.95	45.43	74	-28.57
4844.000	34.23	7.79	38.42	43.65	47.65	74	-26.35
7266.000	36.39	9.69	37.06	41.92	51.19	74	-22.81
9688.000	37.54	11.15	35.05	38.68	52.77	74	-21.23
14873.890	41.08	14.82	38.91	35.48	53.05	74	-20.95



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1677.621	26.58	4.68	38.03	47.63	41.40	74	-32.60
3415.787	32.06	6.24	37.94	42.52	43.43	74	-30.57
4874.000	34.28	7.83	38.44	43.05	47.13	74	-26.87
7311.000	36.38	9.72	37.03	42.45	51.76	74	-22.24
9748.000	37.55	11.20	35.02	38.08	52.27	74	-21.73
14160.710	39.59	14.63	38.98	38.17	53.94	74	-20.06

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1481.553	25.73	4.45	38.05	43.20	35.81	74	-38.19
3556.843	32.37	6.35	37.96	43.27	44.56	74	-29.44
4874.000	34.28	7.83	38.44	41.96	46.04	74	-27.96
7311.000	36.38	9.72	37.03	41.67	50.98	74	-23.02
9748.000	37.55	11.20	35.02	38.14	52.33	74	-21.67
14079.080	39.39	14.61	38.99	37.58	53.11	74	-20.89



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1611.091	26.30	4.60	38.04	41.90	35.25	74	-38.75
3318.471	31.89	6.17	37.93	43.01	43.73	74	-30.27
4904.000	34.33	7.87	38.45	43.39	47.56	74	-26.44
7356.000	36.36	9.75	36.99	41.55	50.90	74	-23.10
9808.000	37.56	11.26	35.00	38.08	52.36	74	-21.64
13326.750	38.67	13.85	38.33	39.12	53.75	74	-20.25

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
1597.181	26.24	4.59	38.04	47.32	40.60	74	-33.40
3485.601	32.18	6.29	37.95	44.38	45.44	74	-28.56
4924.000	34.33	7.87	38.45	43.66	47.83	74	-26.17
7356.000	36.36	9.75	36.99	42.76	52.11	74	-21.89
9808.000	37.56	11.26	35.00	38.41	52.69	74	-21.31
14830.960	41.00	14.81	38.92	36.30	53.76	74	-20.24

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

- 2) Scan from 9kHz to 25GHz, The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.



7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.10.5

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

7.6.1 E.U.T. Operation

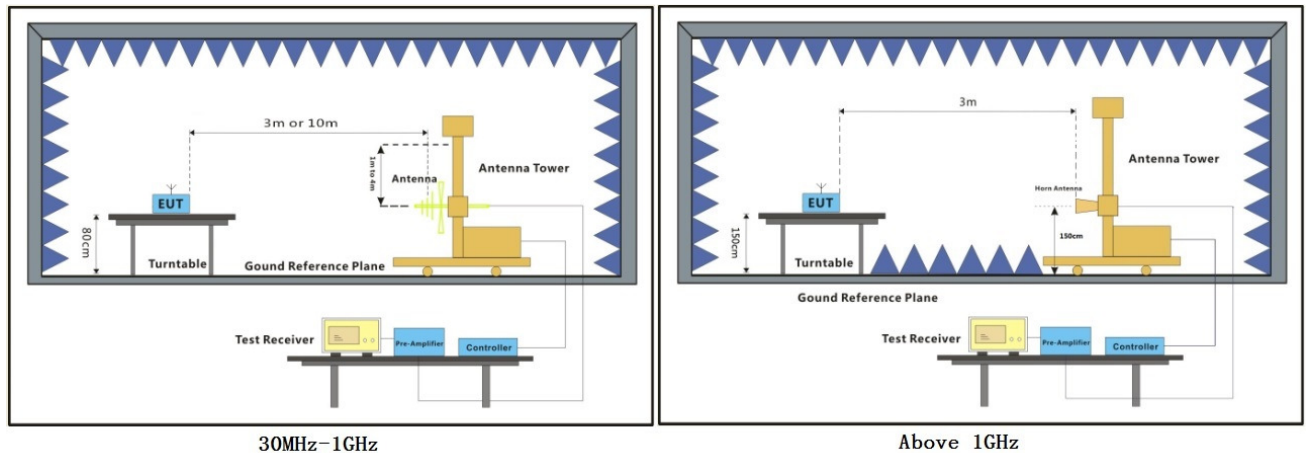
Operating Environment:

Temperature: 23.0 °C Humidity: 53 % RH Atmospheric Pressure: 1020 mbar

Test Mode: Transmitting with all kind of modulations, data rates

Final Test Mode: Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b;
6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)

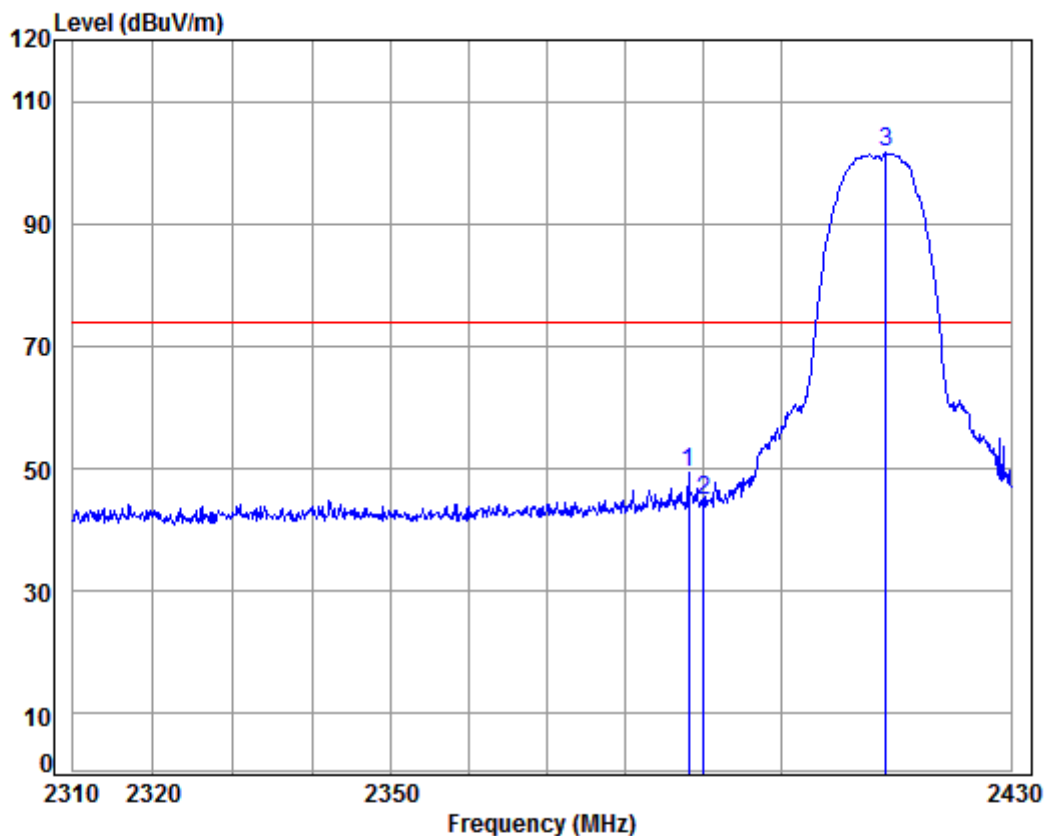
7.6.2 Test Setup Diagram



7.6.3 Measurement Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Mode:a; Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low



Condition: 3m HORIZONTAL

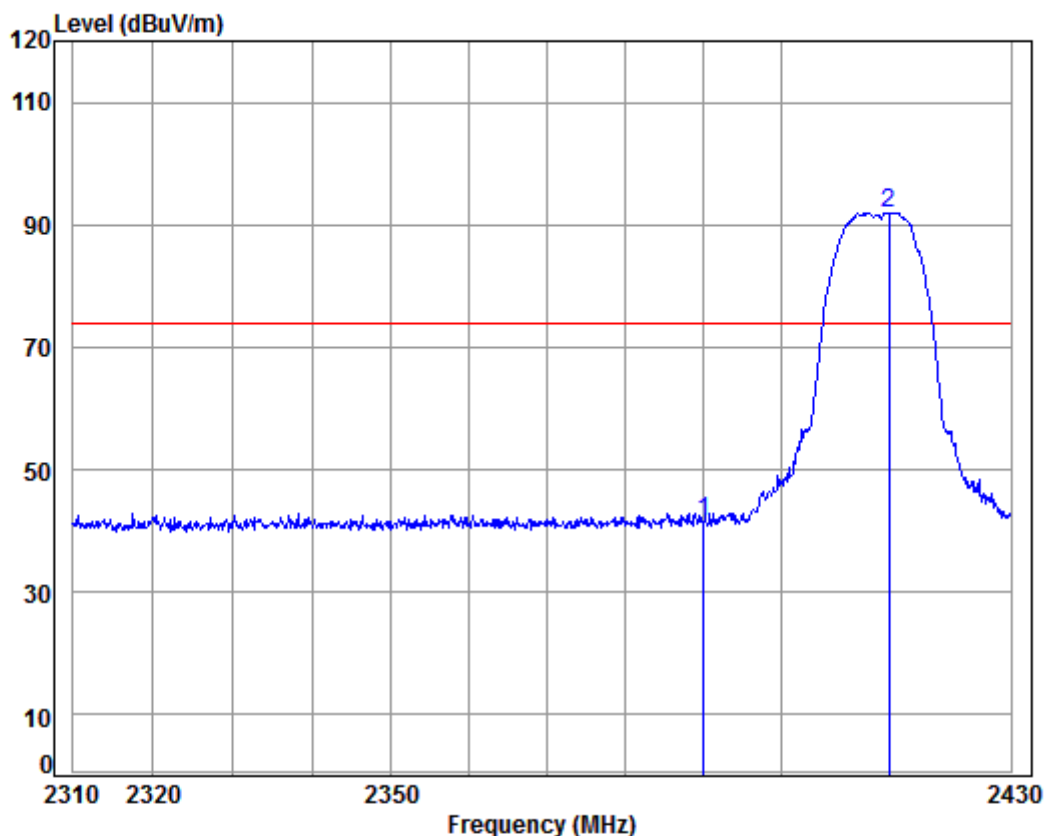
Job No: : 02497CR

Mode: : 2412 Band edge

: 2.4G WIFI B

	Freq	Cable Loss	Ant Factor	Preamplifier Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2388.032	5.34	29.07	37.96	52.92	49.37	74.00	-24.63	Peak
2	2390.000	5.34	29.08	37.96	48.19	44.65	74.00	-29.35	Peak
3 pp	2413.688	5.36	29.15	37.96	104.98	101.53	74.00	27.53	Peak

Mode:a; Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:Low



Condition: 3m VERTICAL

Job No: : 02497CR

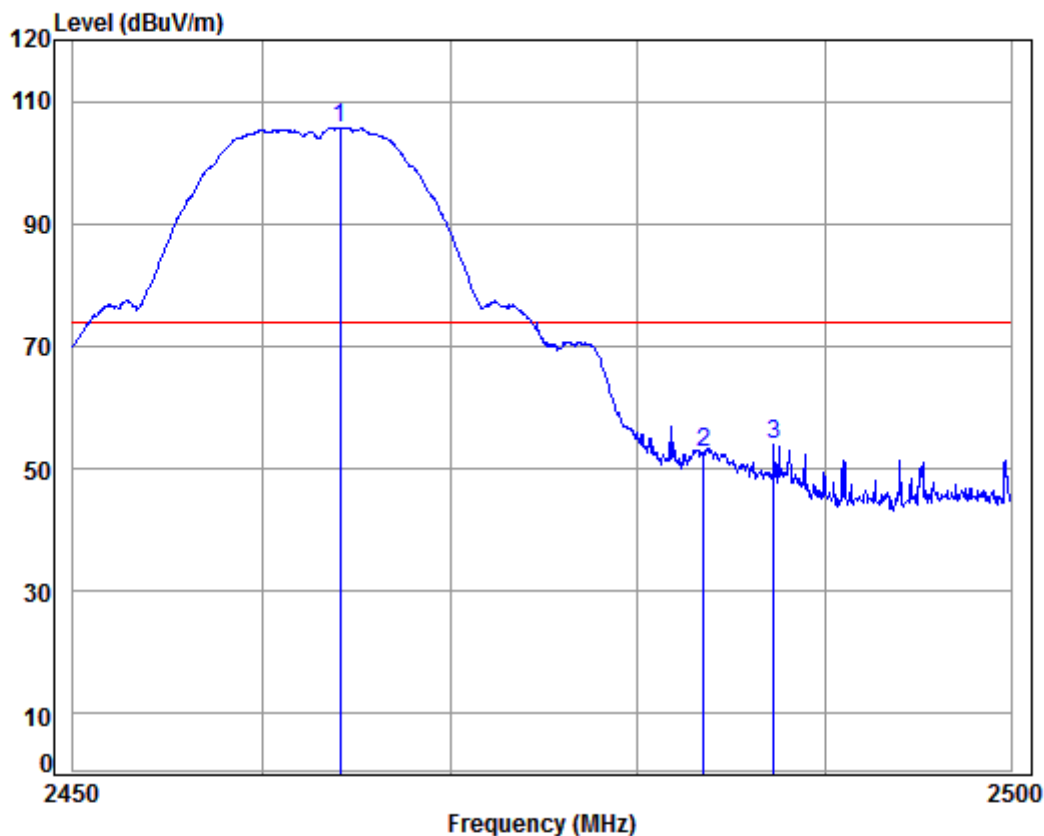
Mode: : 2412 Band edge

: 2.4G WIFI B

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	45.15	41.61	74.00	-32.39	Peak
2	2414.054	5.36	29.15	37.96	95.44	91.99	74.00	17.99	Peak



Mode:a; Polarization:Horizontal; Modulation Type:802.11b; bandwidth:20MHz; Channel:High



Condition: 3m HORIZONTAL

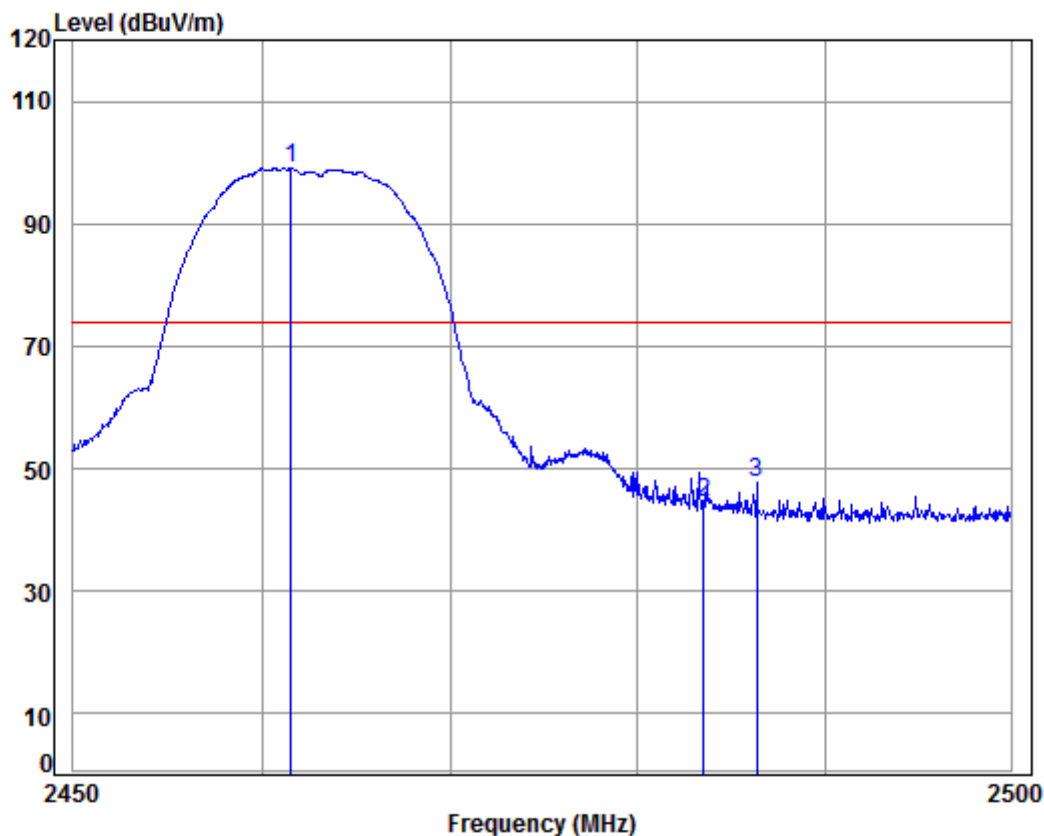
Job No: : 02497CR

Mode: : 2462 Band edge

: 2.4G WIFI B

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2464.147	5.39	29.30	37.95	109.00	105.74	74.00	31.74 Peak
2	2483.500	5.41	29.35	37.95	55.72	52.53	74.00	-21.47 Peak
3	2487.254	5.41	29.36	37.95	57.15	53.97	74.00	-20.03 Peak

Mode:a; Polarization:Vertical; Modulation Type:802.11b; bandwidth:20MHz; Channel:High



Condition: 3m VERTICAL

Job No: : 02497CR

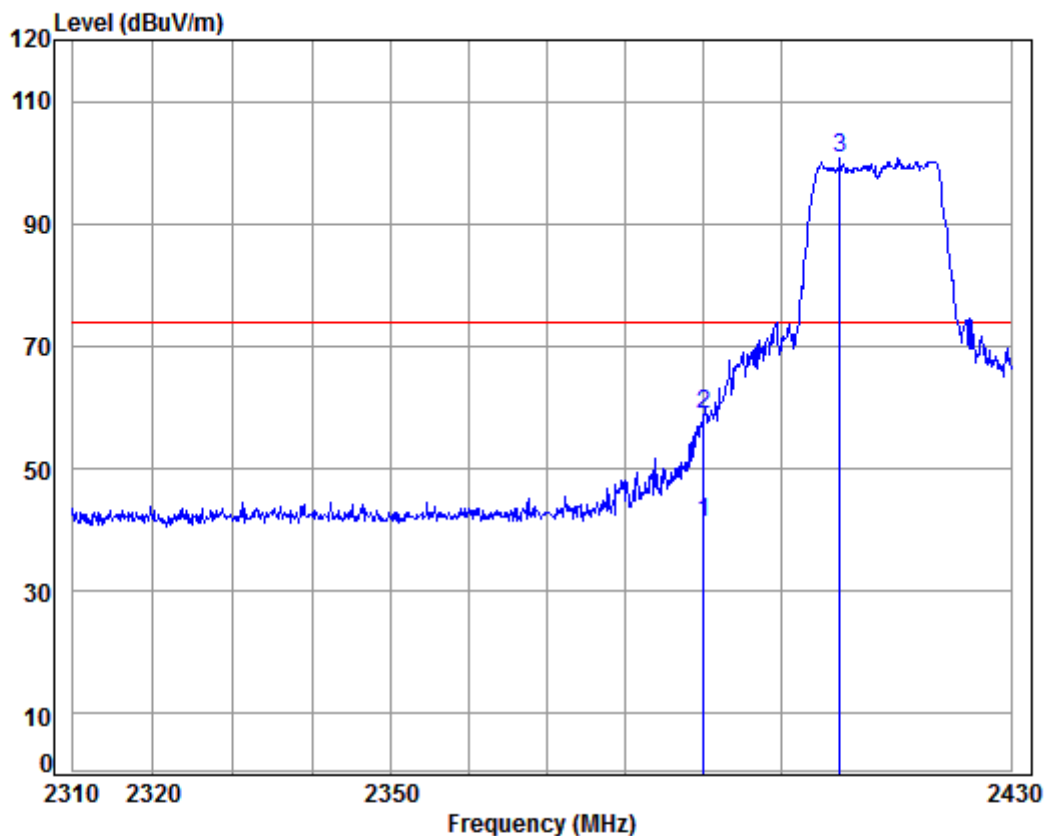
Mode: : 2462 Band edge

: 2.4G WIFI B

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2461.510	5.39	29.29	37.95	102.28	99.01	74.00	25.01 Peak
2	2483.500	5.41	29.35	37.95	47.67	44.48	74.00	-29.52 Peak
3	2486.350	5.41	29.36	37.95	50.77	47.59	74.00	-26.41 Peak



Mode:a; Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low



Condition: 3m HORIZONTAL

Job No: : 02497CR

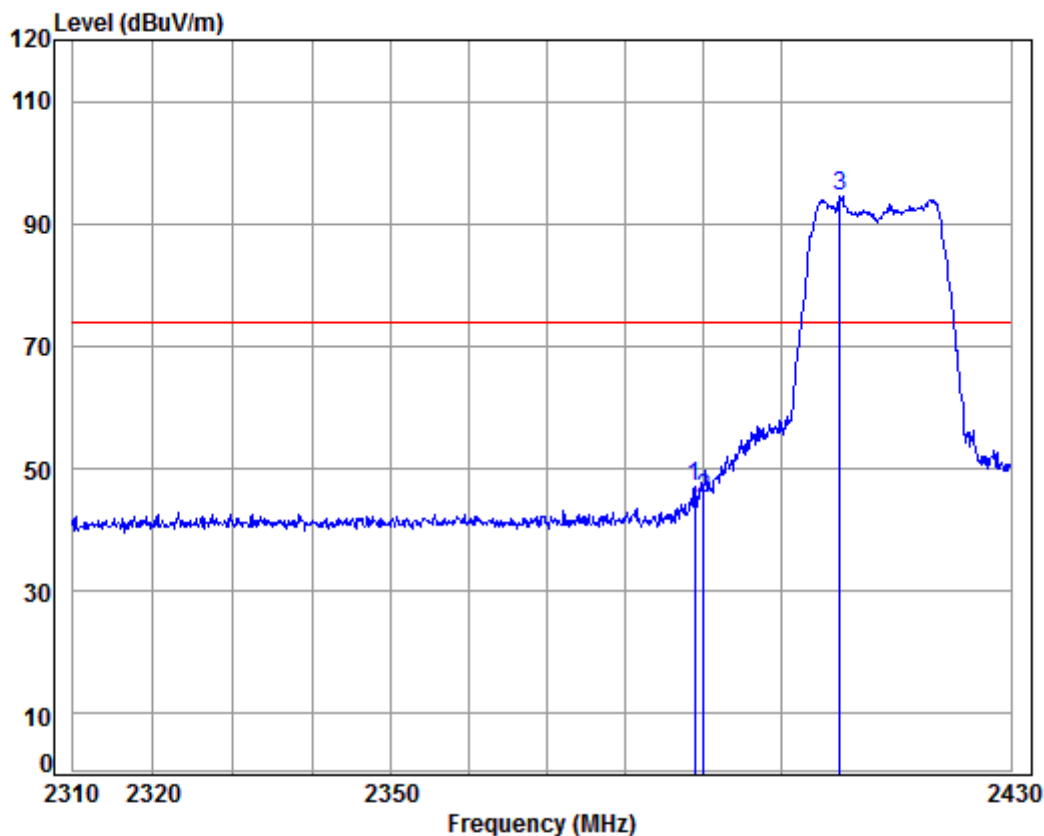
Mode: : 2412 Band edge

: 2.4G WIFI G

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 av	2390.000	5.34	29.08	37.96	44.71	41.17	54.00	-12.83 Average
2	2390.000	5.34	29.08	37.96	62.54	59.00	74.00	-15.00 Peak
3 pp	2407.705	5.35	29.13	37.96	104.19	100.71	74.00	26.71 Peak



Mode:a; Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:Low



Condition: 3m VERTICAL

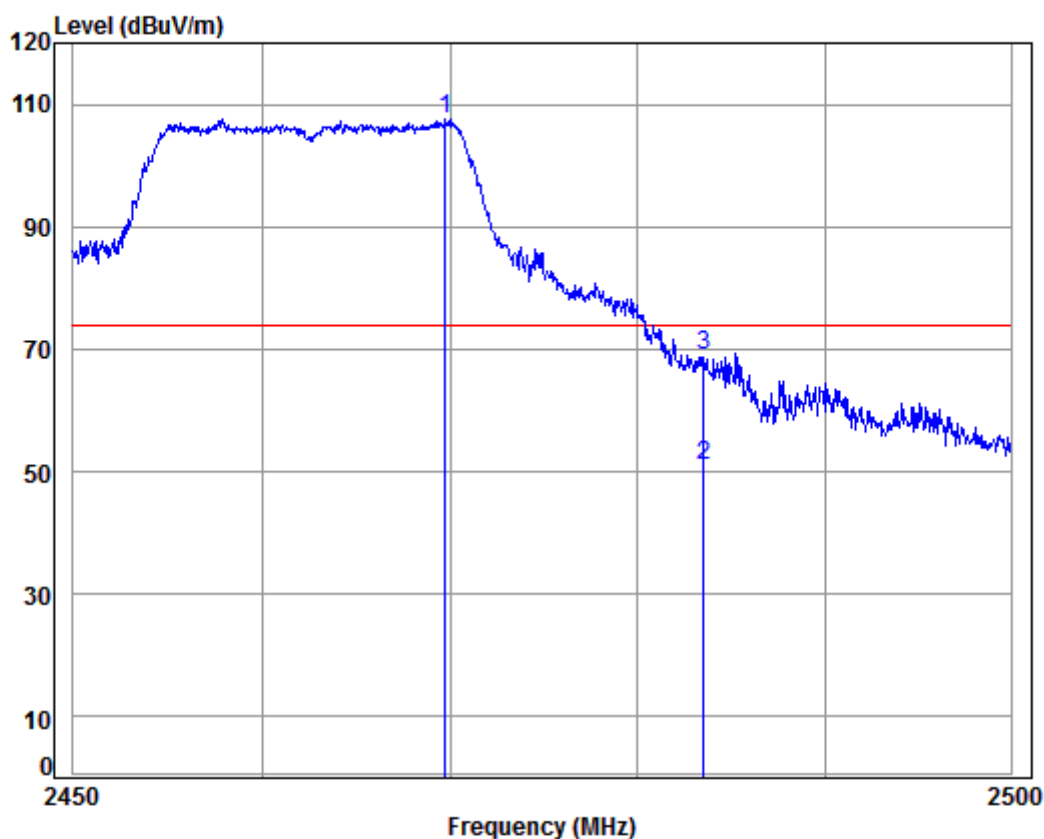
Job No: : 02497CR

Mode: : 2412 Band edge

: 2.4G WIFI G

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2388.879	5.34	29.07	37.96	50.79	47.24	74.00	-26.76	Peak
2	2390.000	5.34	29.08	37.96	48.72	45.18	74.00	-28.82	Peak
3 pp	2407.705	5.35	29.13	37.96	97.97	94.49	74.00	20.49	Peak

Mode:a; Polarization:Horizontal; Modulation Type:802.11g; bandwidth:20MHz; Channel:High



Condition: 3m HORIZONTAL

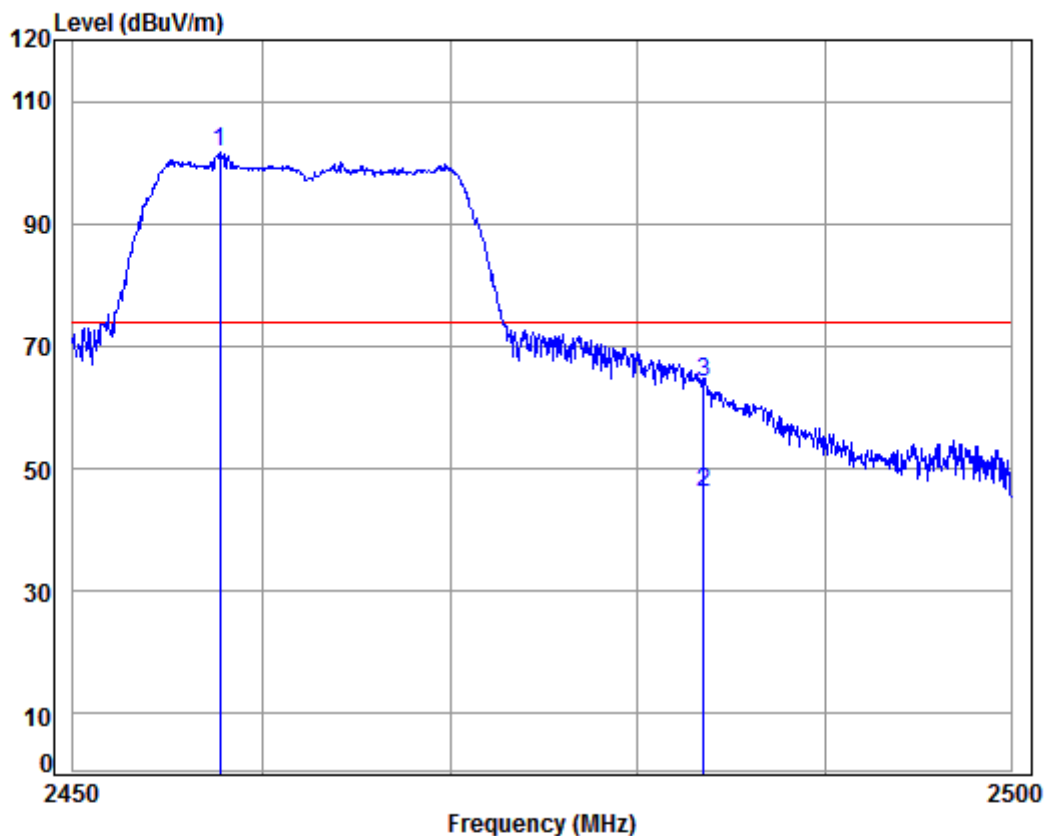
Job No: : 02497CR

Mode: : 2462 Band edge

: 2.4G WIFI G

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2469.729	5.40	29.31	37.95	110.76	107.52	74.00	33.52 Peak
2 av	2483.500	5.41	29.35	37.95	54.11	50.92	54.00	-3.08 Average
3	2483.500	5.41	29.35	37.95	72.21	69.02	74.00	-4.98 Peak

Mode:a; Polarization:Vertical; Modulation Type:802.11g; bandwidth:20MHz; Channel:High



Condition: 3m VERTICAL

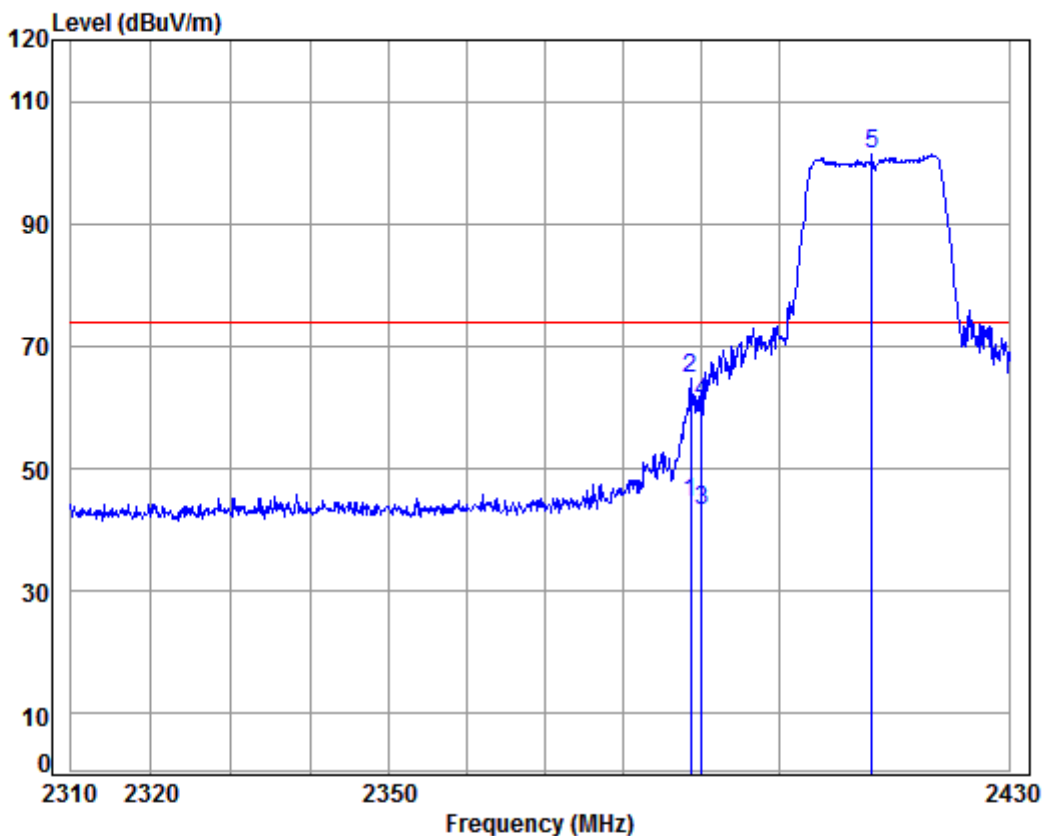
Job No: : 02497CR

Mode: : 2462 Band edge

: 2.4G WIFI G

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2457.783	5.39	29.28	37.95	104.90	101.62	74.00	27.62 Peak
2 av	2483.500	5.41	29.35	37.95	49.44	46.25	54.00	-7.75 Average
3	2483.500	5.41	29.35	37.95	67.31	64.12	74.00	-9.88 Peak

Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low



Condition: 3m HORIZONTAL

Job No: : 02497CR

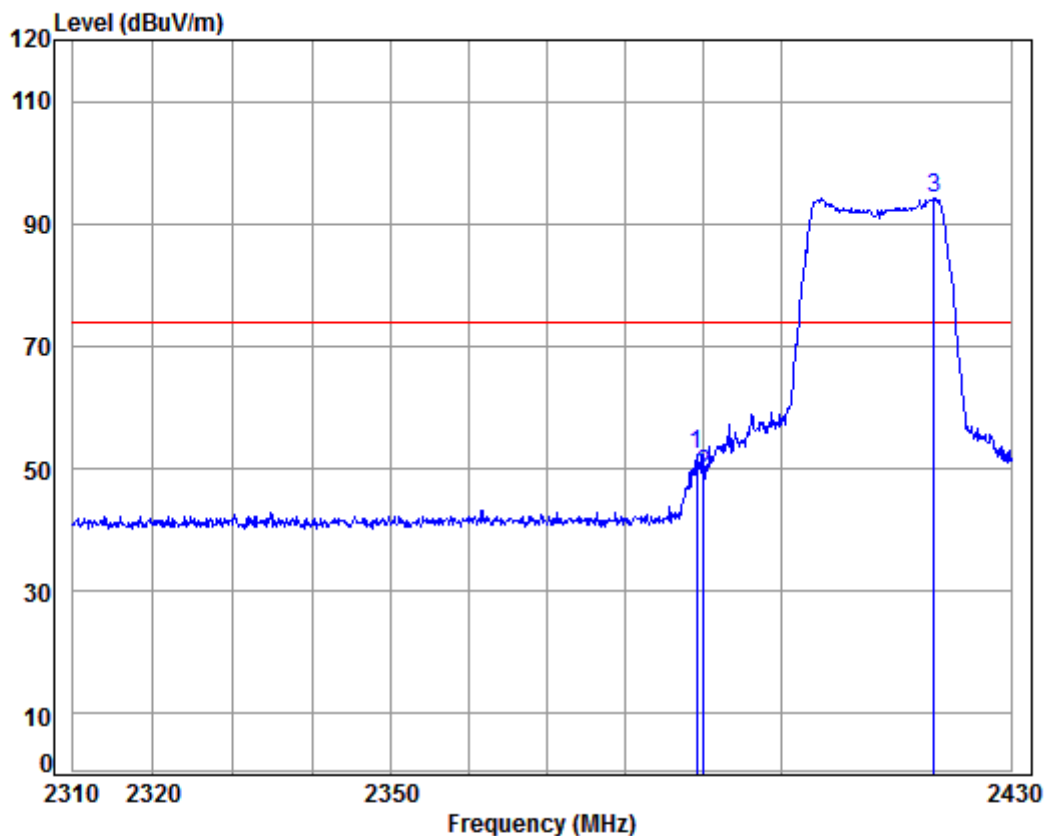
Mode: : 2412 Band edge

: 2.4G WIFI N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	av 2388.637	5.34	29.07	37.96	48.16	44.61	54.00	-9.39	Average
2	2388.637	5.34	29.07	37.96	68.20	64.65	74.00	-9.35	Peak
3	2390.000	5.34	29.08	37.96	46.58	43.04	54.00	-10.96	Average
4	2390.000	5.34	29.08	37.96	64.49	60.95	74.00	-13.05	Peak
5	pp 2412.099	5.35	29.14	37.96	104.87	101.40	74.00	27.40	Peak



Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:Low



Condition: 3m VERTICAL

Job No: : 02497CR

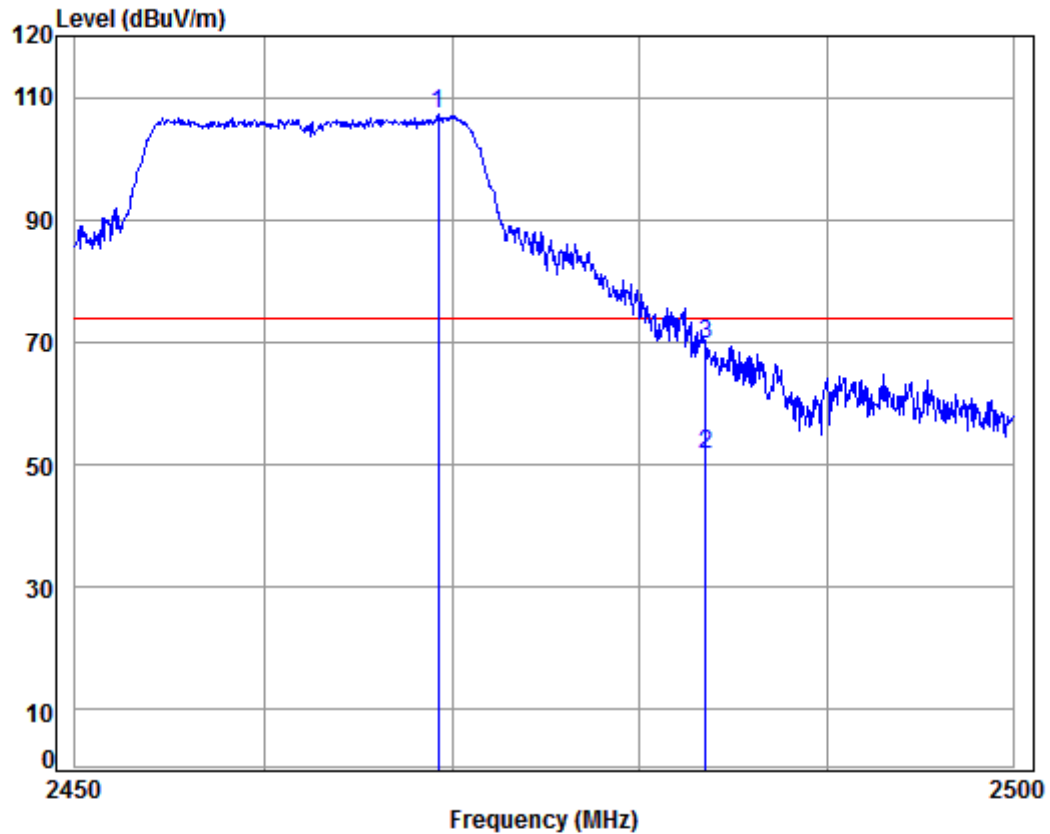
Mode: : 2412 Band edge

: 2.4G WIFI N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.121	5.34	29.07	37.96	55.97	52.42	74.00	-21.58	Peak
2	2390.000	5.34	29.08	37.96	52.66	49.12	74.00	-24.88	Peak
3 pp	2419.930	5.36	29.17	37.96	97.75	94.32	74.00	20.32	Peak



Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:20MHz; Channel:High



Condition: 3m HORIZONTAL

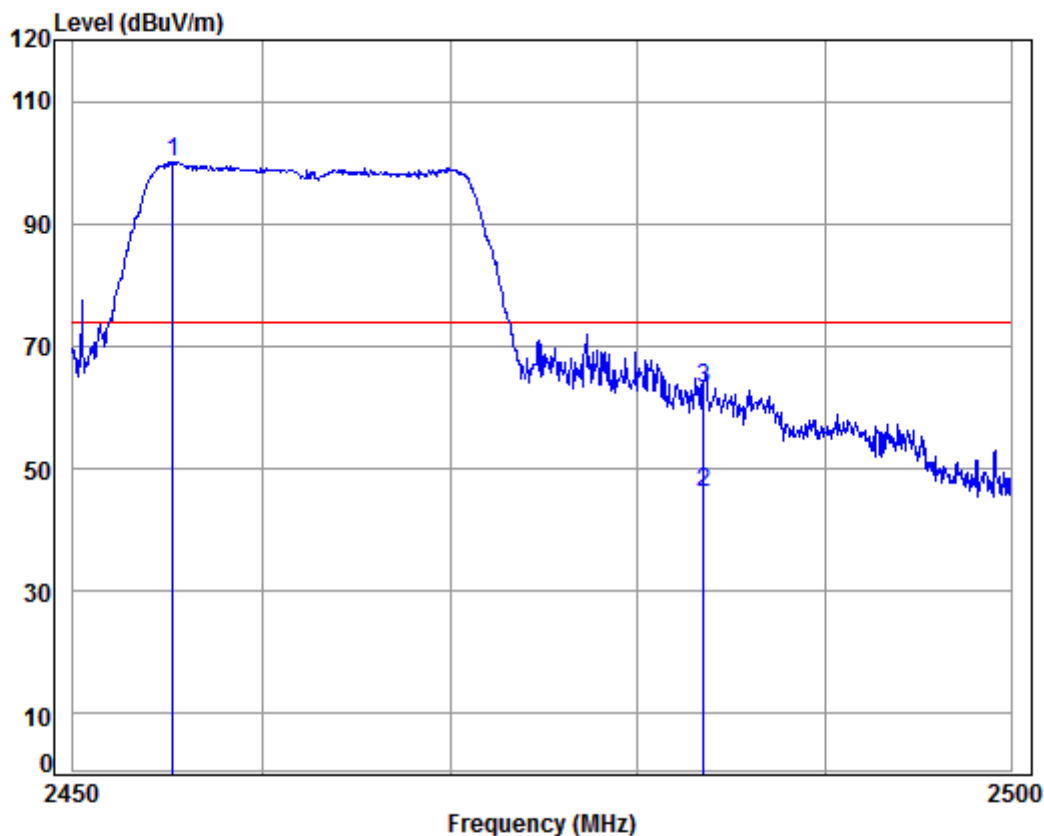
Job No: : 02497CR

Mode: : 2462 Band edge

: 2.4G WIFI N20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	2469.230	5.40	29.31	37.95	110.33	107.09	74.00	33.09 Peak
2 av	2483.500	5.41	29.35	37.95	54.98	51.79	54.00	-2.21 Average
3	2483.500	5.41	29.35	37.95	72.79	69.60	74.00	-4.40 Peak

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:20MHz; Channel:High



Condition: 3m VERTICAL

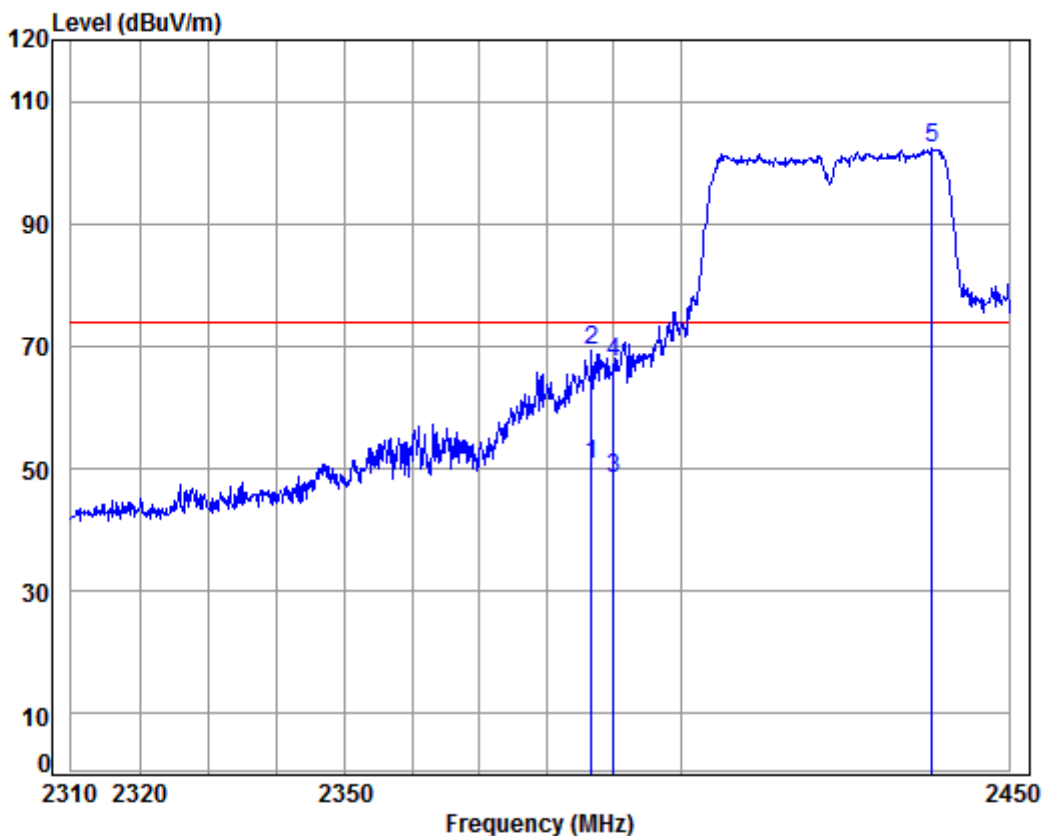
Job No: : 02497CR

Mode: : 2462 Band edge

: 2.4G WIFI N20

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2455.302	5.39	29.27	37.95	103.49	100.20	74.00	26.20	Peak
2 av	2483.500	5.41	29.35	37.95	49.29	46.10	54.00	-7.90	Average
3	2483.500	5.41	29.35	37.95	66.24	63.05	74.00	-10.95	Peak

Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low



Condition: 3m HORIZONTAL

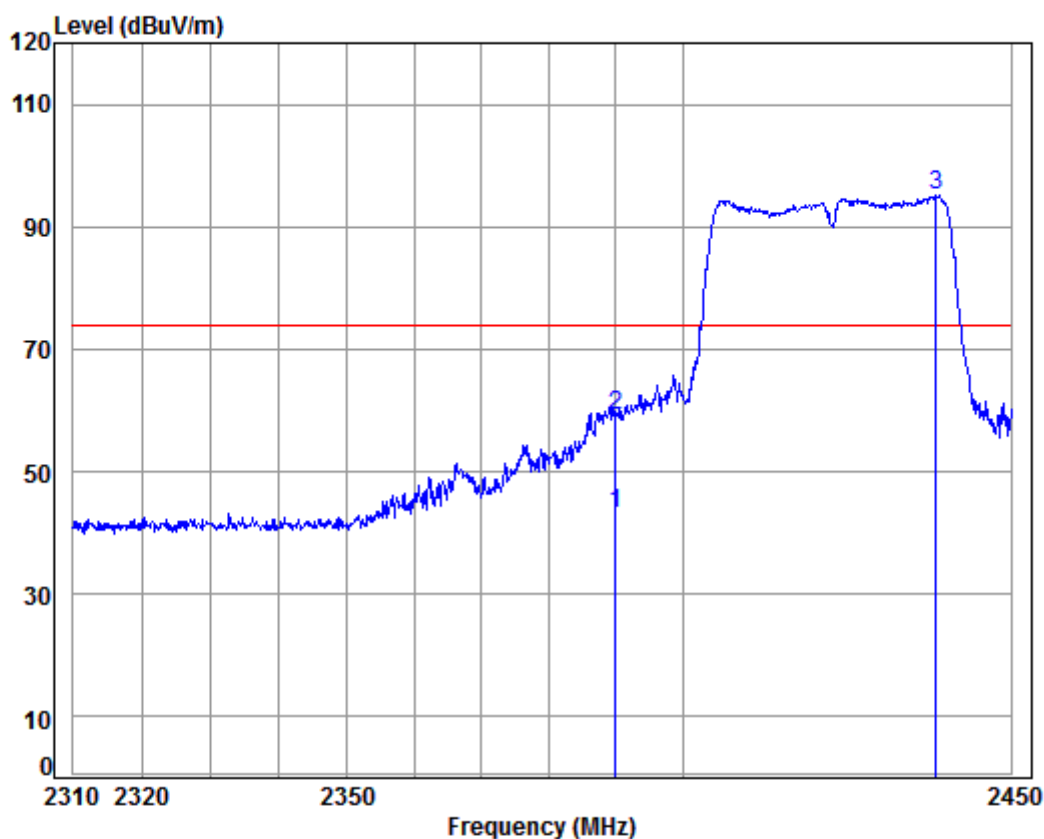
Job No: : 02497CR

Mode: : 2422 Band edge

: 2.4G WIFI N40

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 av	2386.682	5.33	29.07	37.96	54.26	50.70	54.00	-3.30	Average
2	2386.682	5.33	29.07	37.96	72.73	69.17	74.00	-4.83	Peak
3	2390.000	5.34	29.08	37.96	51.97	48.43	54.00	-5.57	Average
4	2390.000	5.34	29.08	37.96	70.98	67.44	74.00	-6.56	Peak
5 pp	2438.208	5.37	29.22	37.96	105.61	102.24	74.00	28.24	Peak

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:Low



Condition: 3m VERTICAL

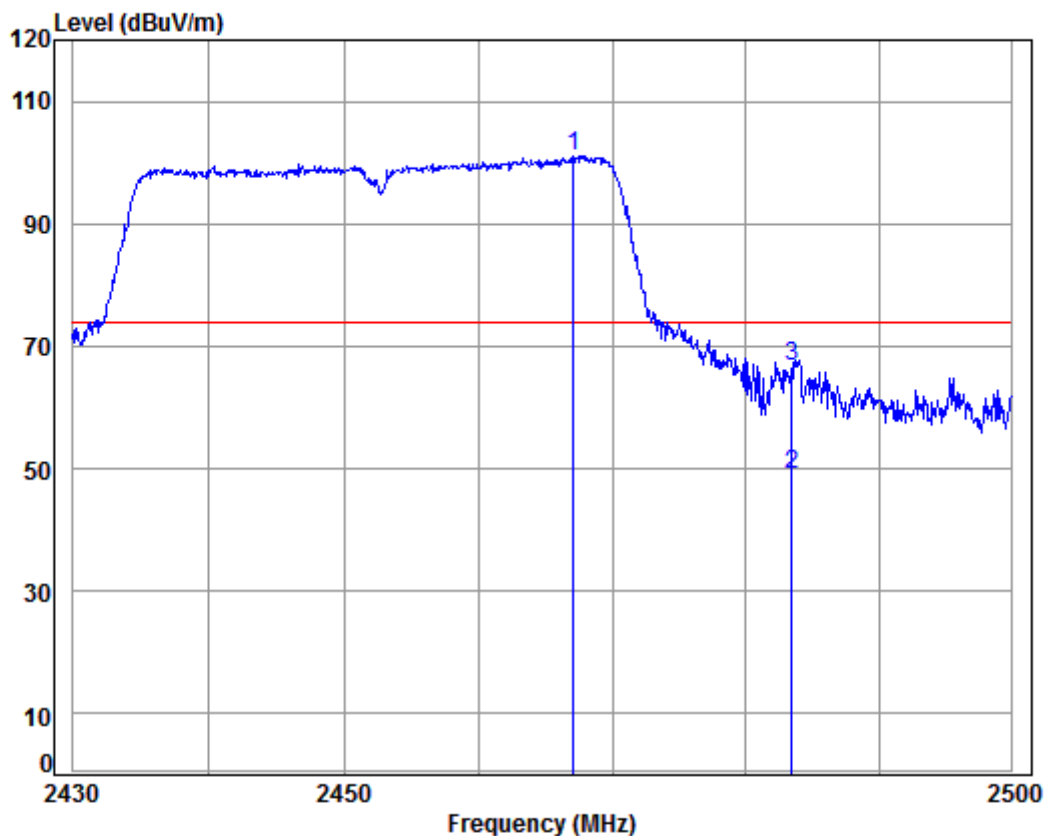
Job No: : 02497CR

Mode: : 2422 Band edge

: 2.4G WIFI N40

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 av	2390.000	5.34	29.08	37.96	46.72	43.18	54.00	-10.82 Average
2	2390.000	5.34	29.08	37.96	62.88	59.34	74.00	-14.66 Peak
3 pp	2438.494	5.37	29.22	37.96	98.48	95.11	74.00	21.11 Peak

Mode:a; Polarization:Horizontal; Modulation Type:802.11n; bandwidth:40MHz; Channel:High



Condition: 3m HORIZONTAL

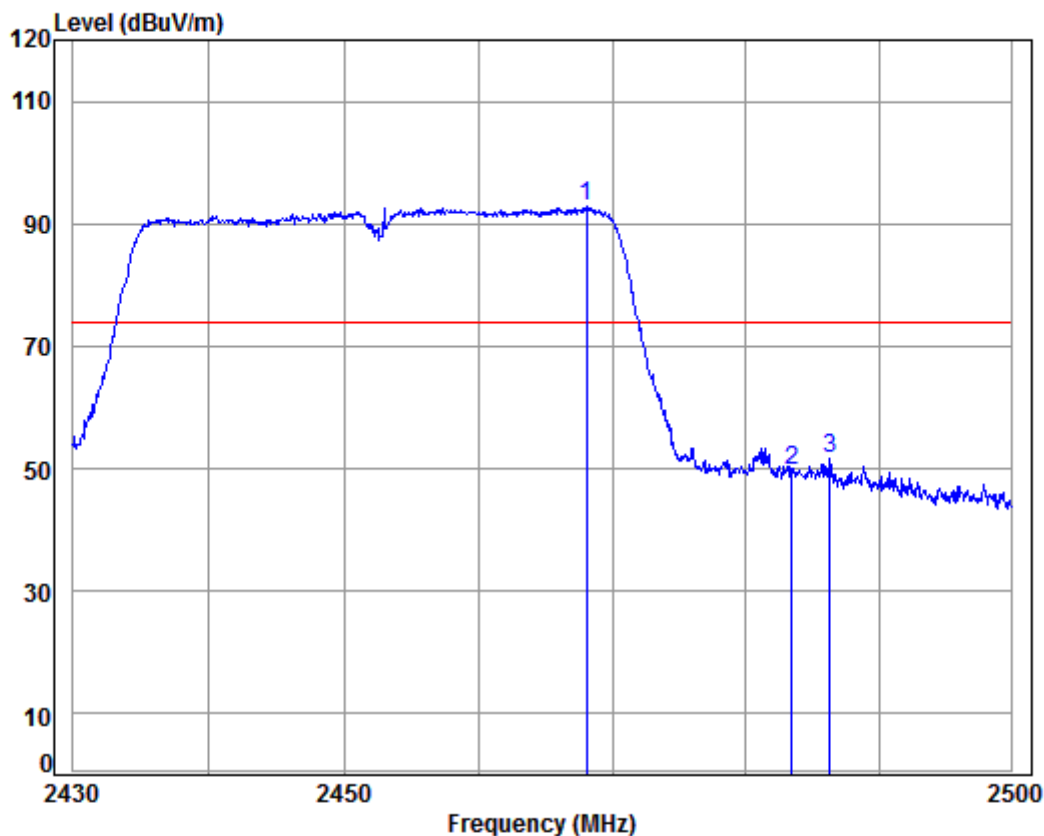
Job No: : 02497CR

Mode: : 2452 Band edge

: 2.4G WIFI N40

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2467.133	5.40	29.31	37.95	104.26	101.02	74.00	27.02	Peak
2 av	2483.500	5.41	29.35	37.95	52.36	49.17	54.00	-4.83	Average
3	2483.500	5.41	29.35	37.95	69.77	66.58	74.00	-7.42	Peak

Mode:a; Polarization:Vertical; Modulation Type:802.11n; bandwidth:40MHz; Channel:High



Condition: 3m VERTICAL

Job No: : 02497CR

Mode: : 2452 Band edge

: 2.4G WIFI N40

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2468.044	5.40	29.31	37.95	96.00	92.76	74.00	18.76	Peak
2	2483.500	5.41	29.35	37.95	52.79	49.60	74.00	-24.40	Peak
3	2486.335	5.41	29.36	37.95	54.73	51.55	74.00	-22.45	Peak

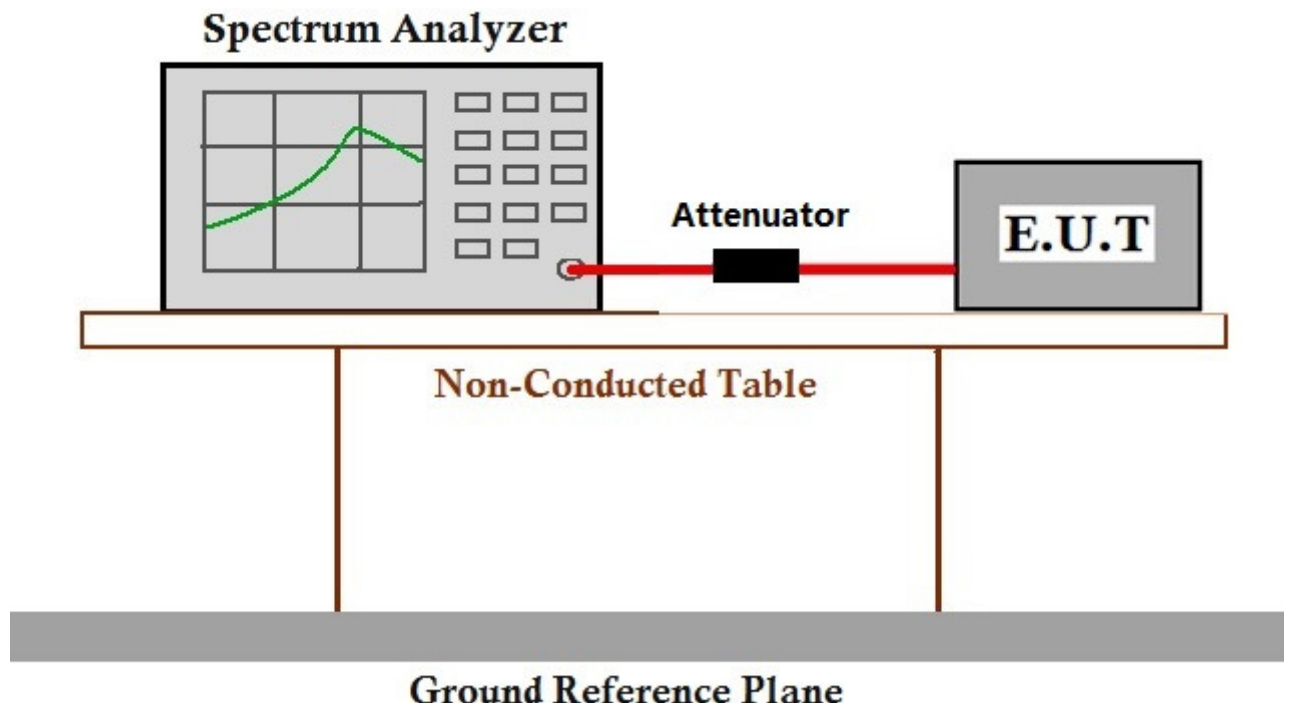
7.7 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 11.13.3.2
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

7.7.1 E.U.T. Operation

Operating Environment:					
Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1020 mbar
Test Mode:	Transmitting with all kind of modulations, data rates				
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20) ; 13.5Mbps of rate is the worst case of 802.11n(HT40)				

7.7.2 Test Setup Diagram

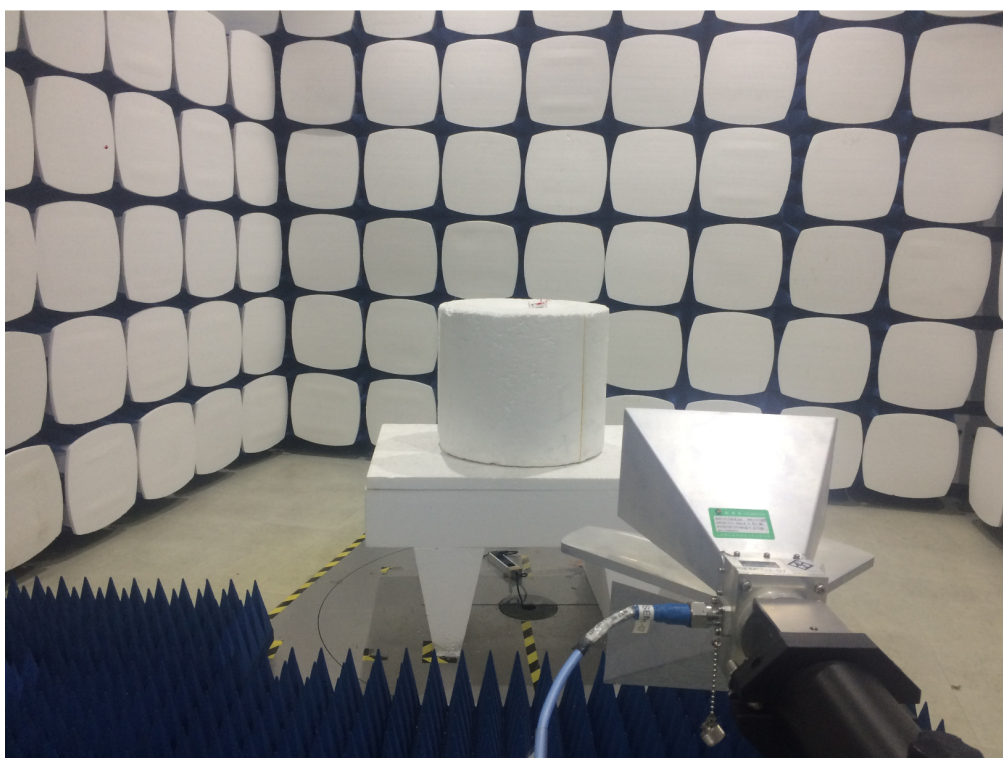
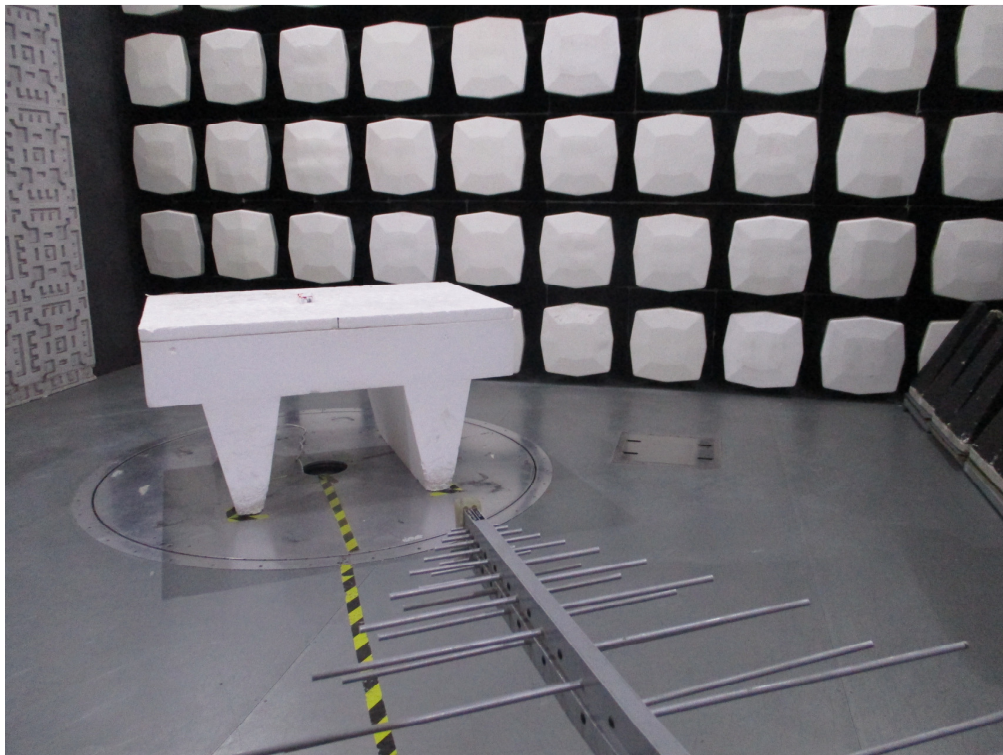


7.7.3 Measurement Data

The detailed test data see: Appendix 15.247

8 Photographs

8.1 Radiated Spurious Emissions Test Setup



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8.2 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1703002497CR.

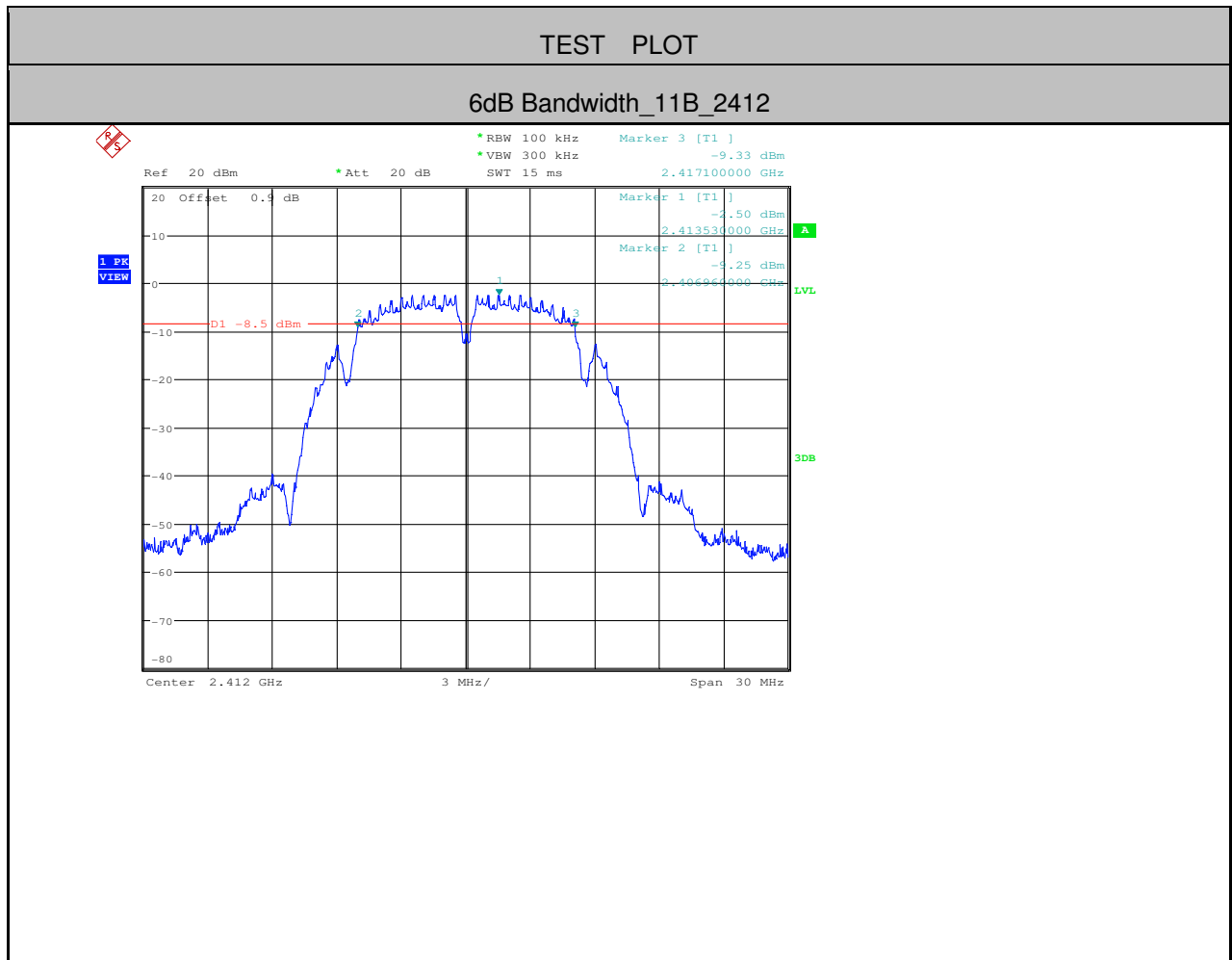


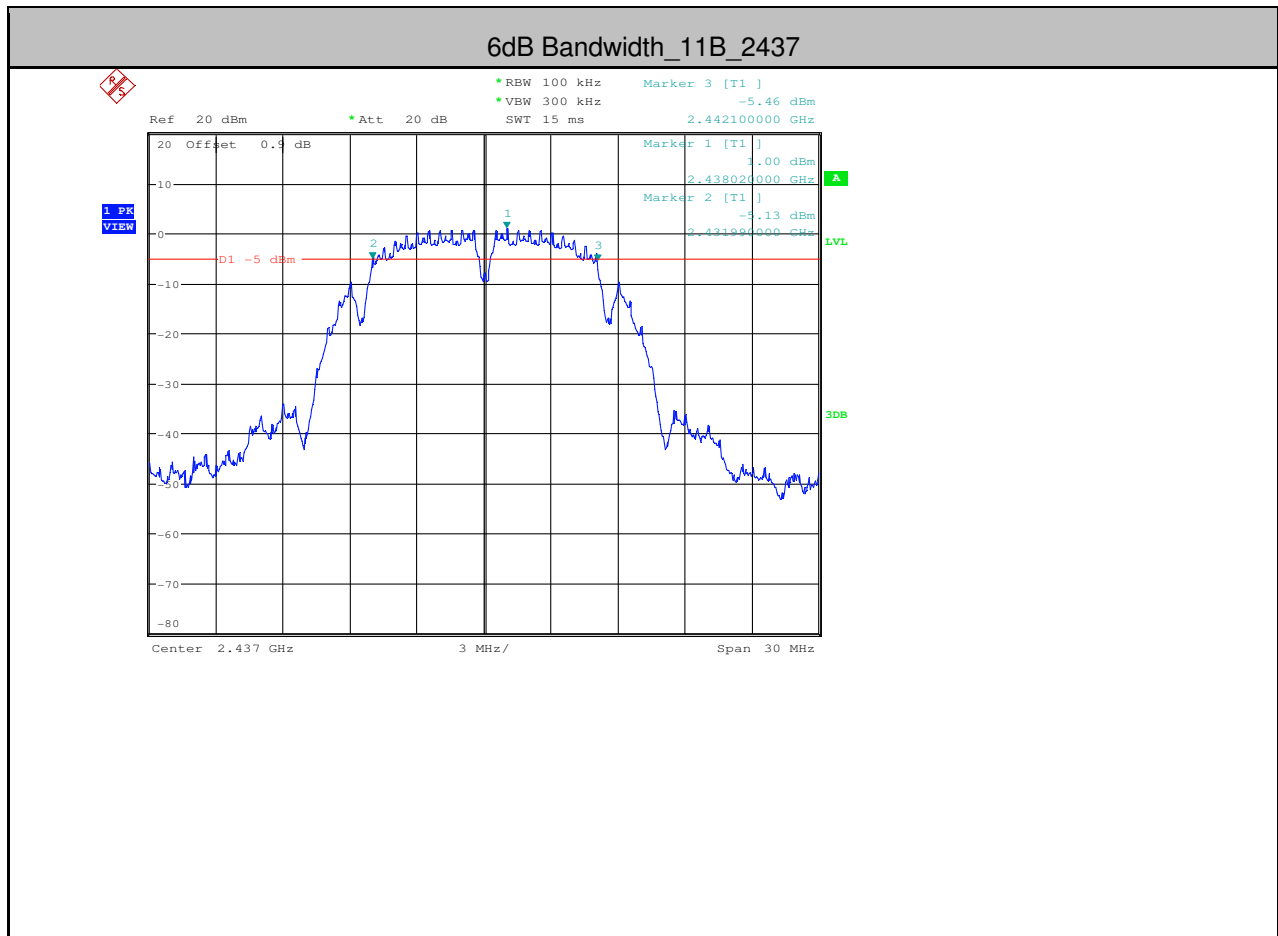
9 Appendix

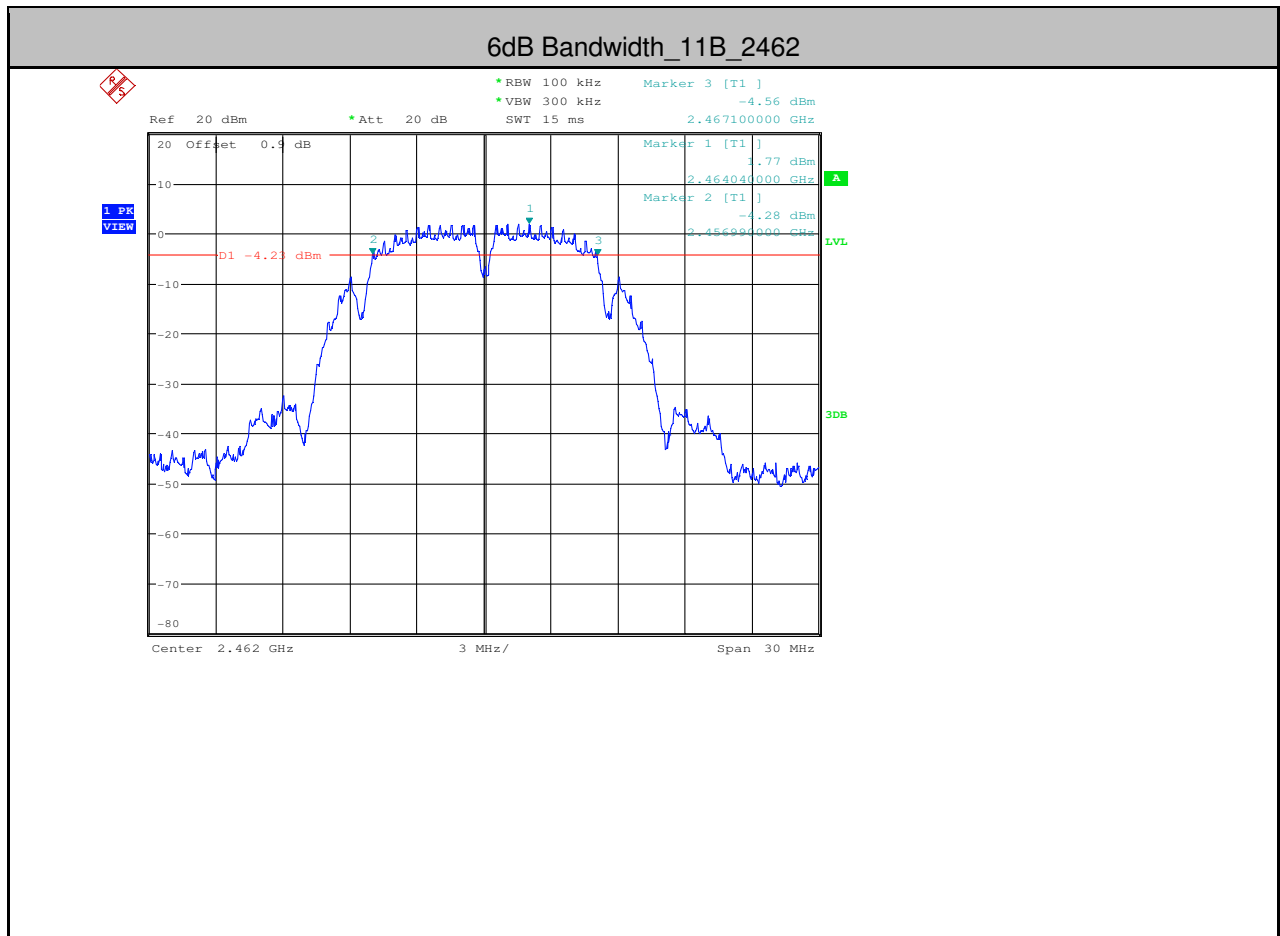
9.1 Appendix 15.247

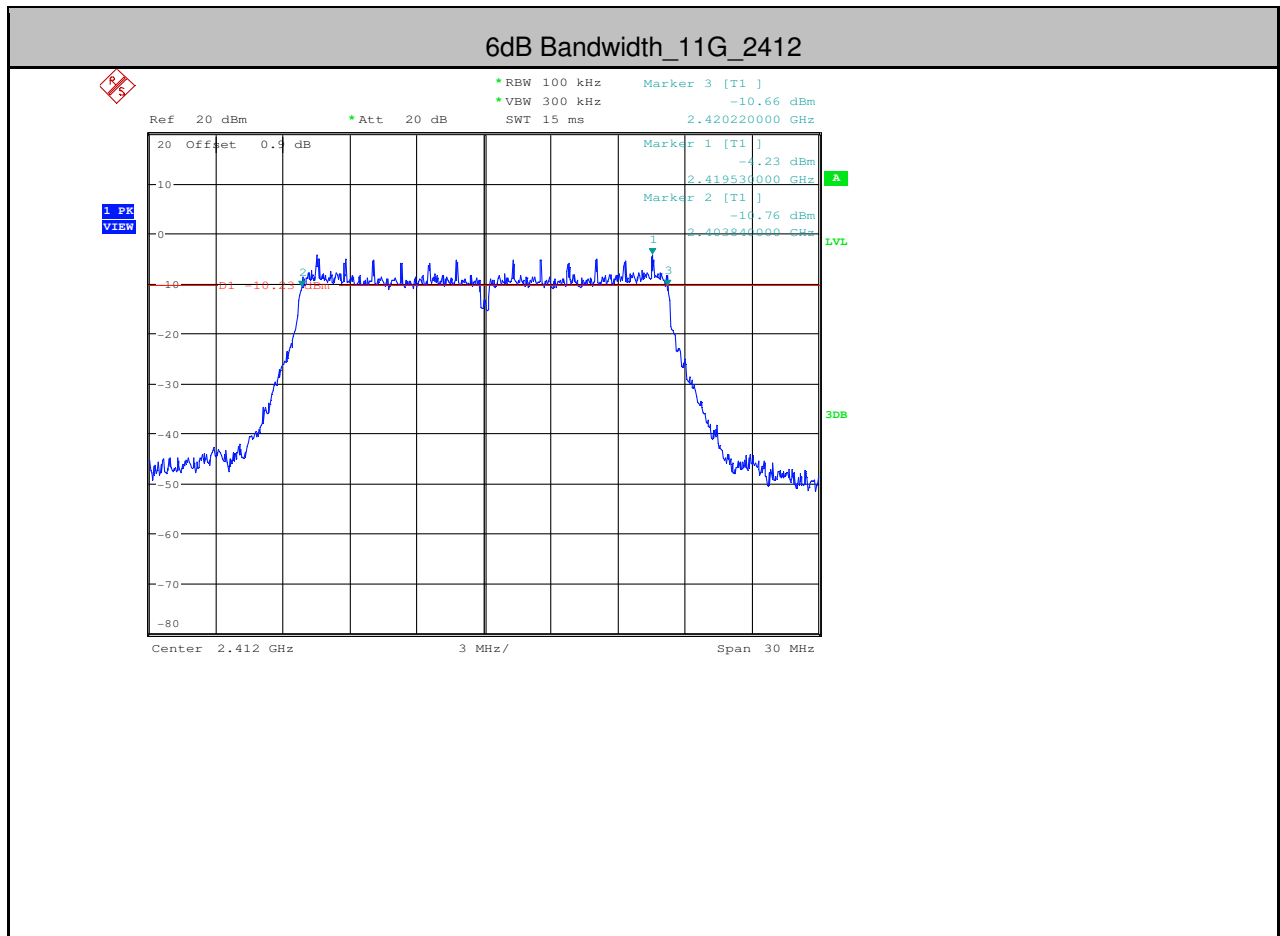
1.6dB Bandwidth

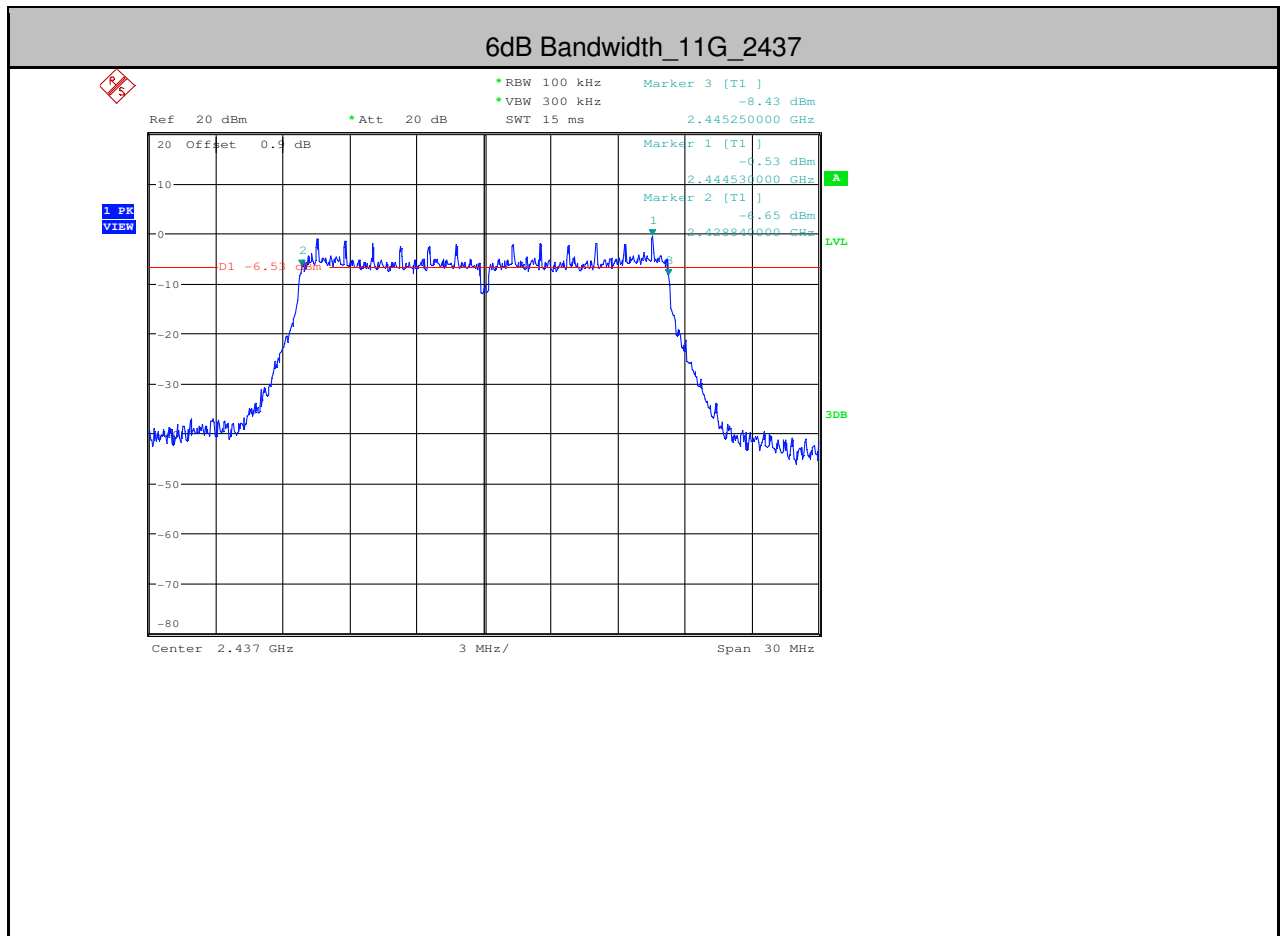
Test Mode	Test Channel	EBW[MHz]	Limit	Verdict
11B	2412	10.140	≥ 0.5	PASS
11B	2437	10.110	≥ 0.5	PASS
11B	2462	10.110	≥ 0.5	PASS
11G	2412	16.380	≥ 0.5	PASS
11G	2437	16.410	≥ 0.5	PASS
11G	2462	16.365	≥ 0.5	PASS
11N20SISO	2412	17.100	≥ 0.5	PASS
11N20SISO	2437	17.100	≥ 0.5	PASS
11N20SISO	2462	17.100	≥ 0.5	PASS
11N40SISO	2422	35.460	≥ 0.5	PASS
11N40SISO	2437	35.460	≥ 0.5	PASS
11N40SISO	2452	35.400	≥ 0.5	PASS

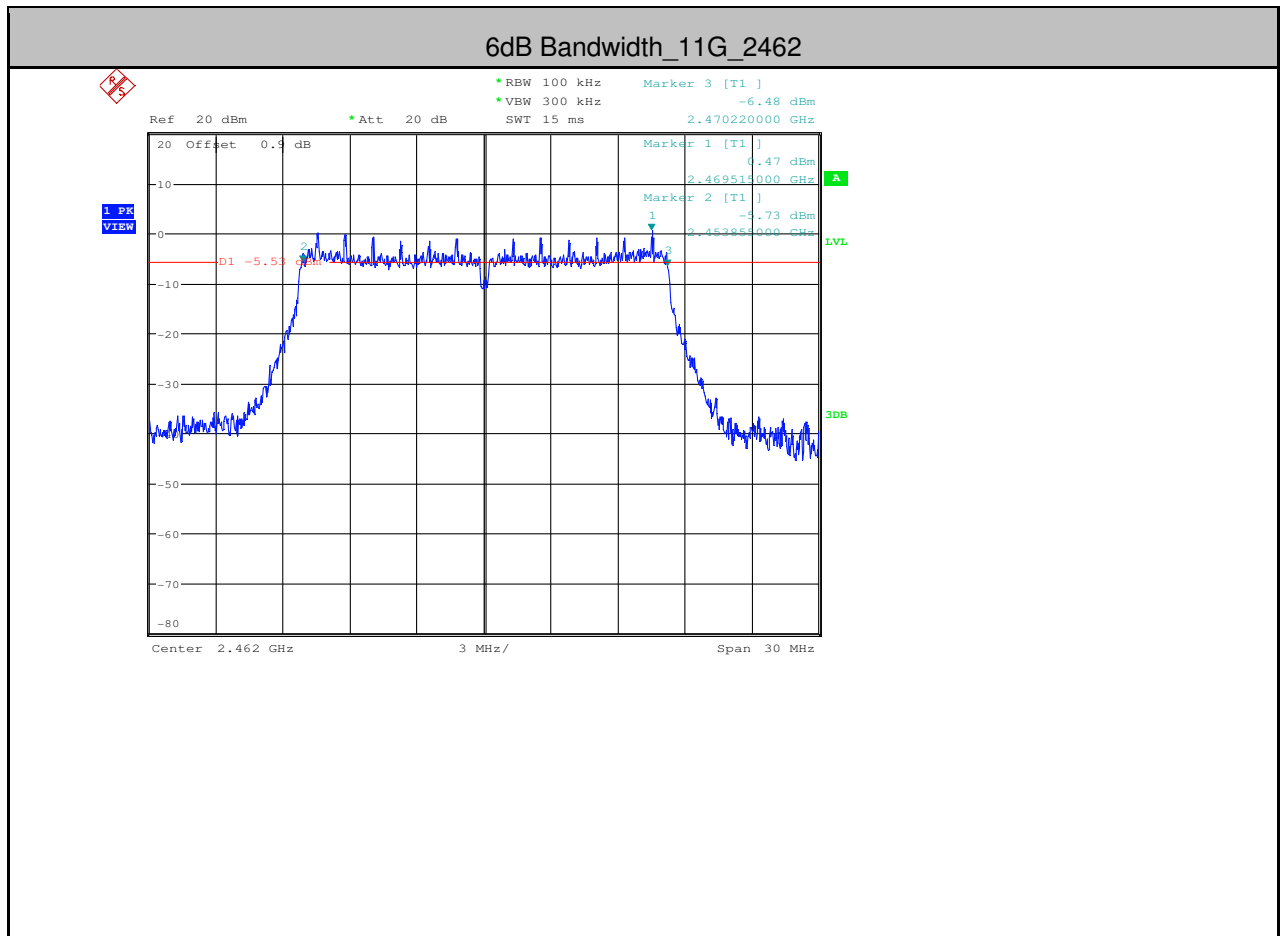


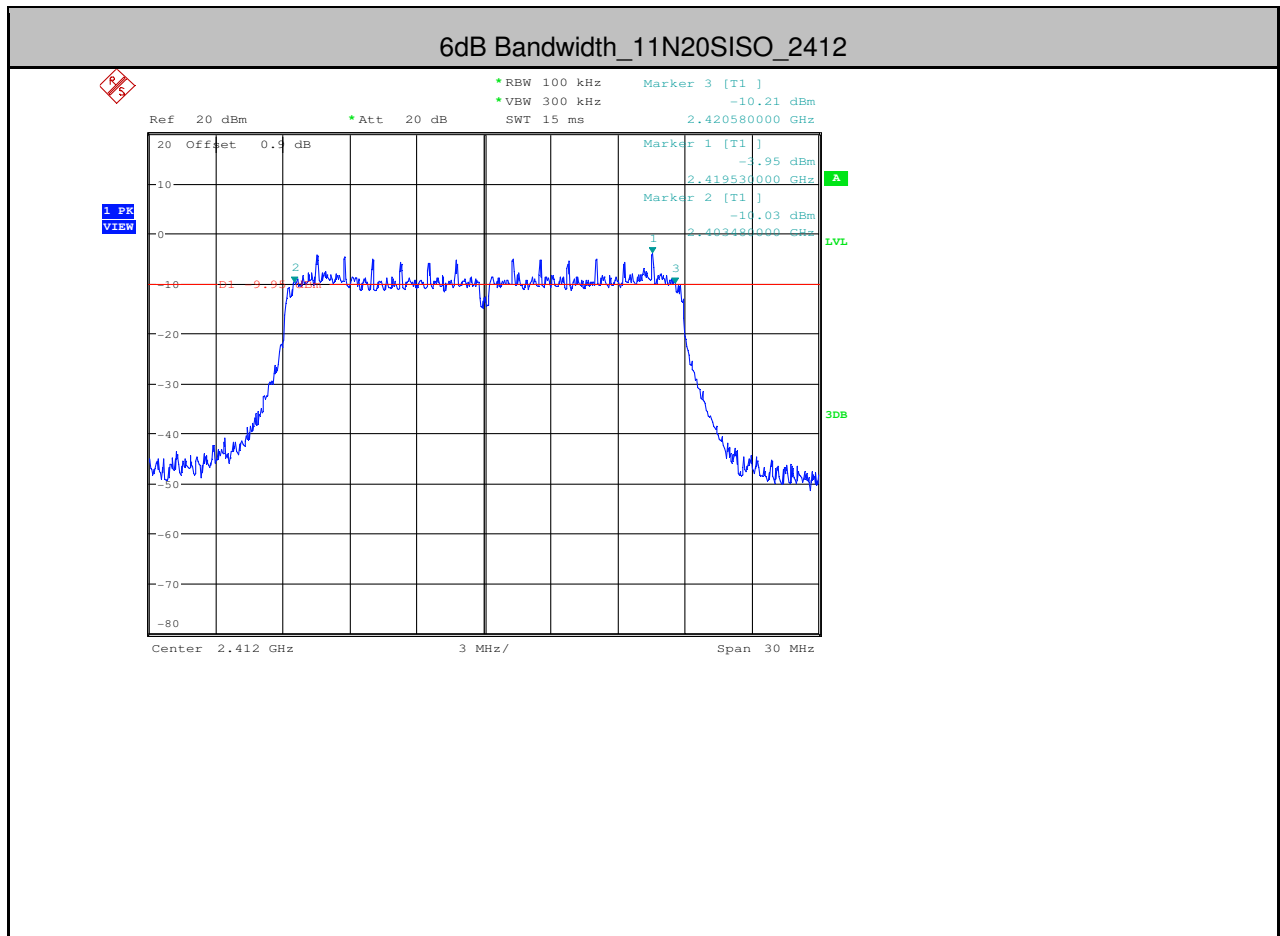


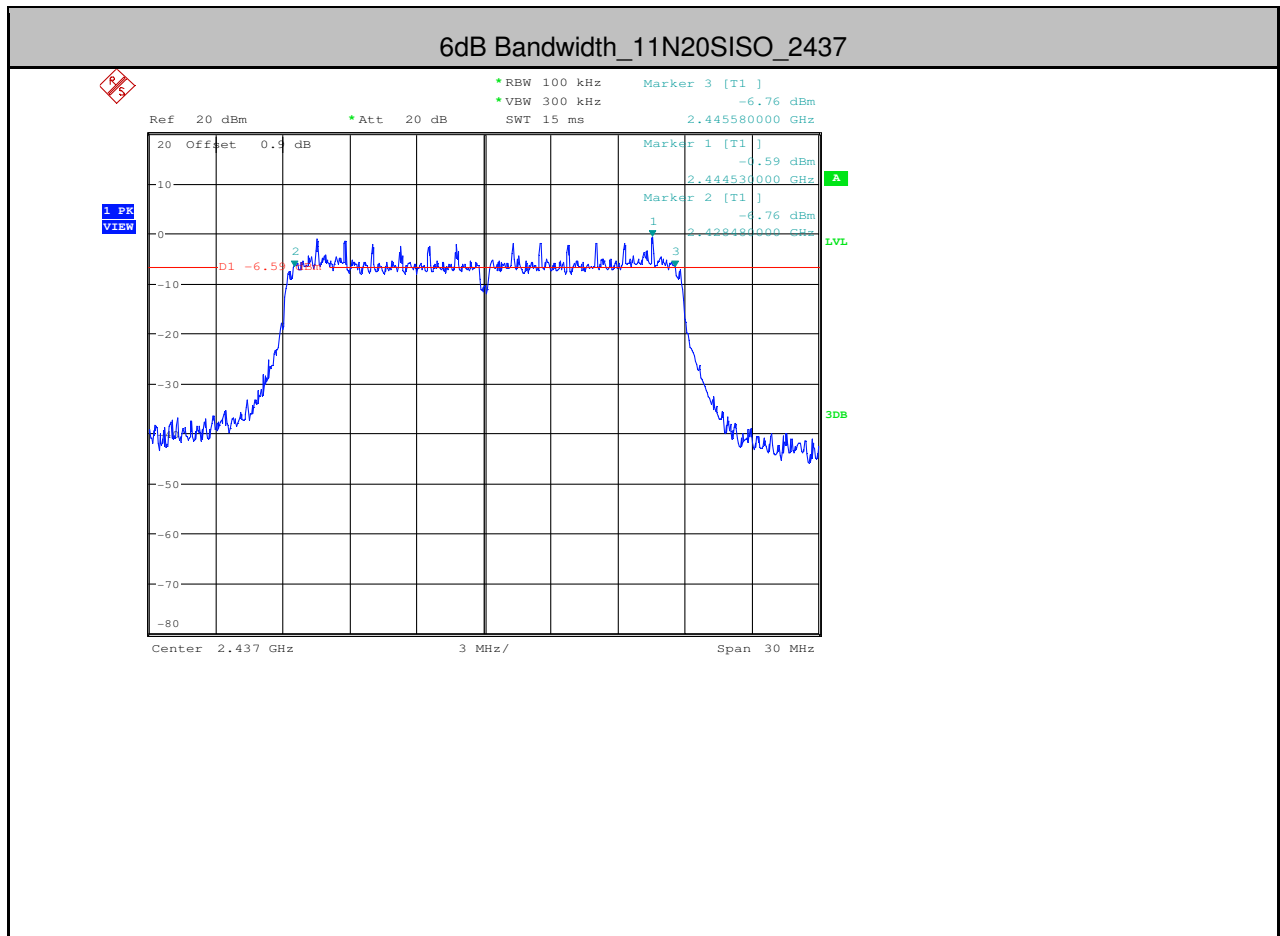


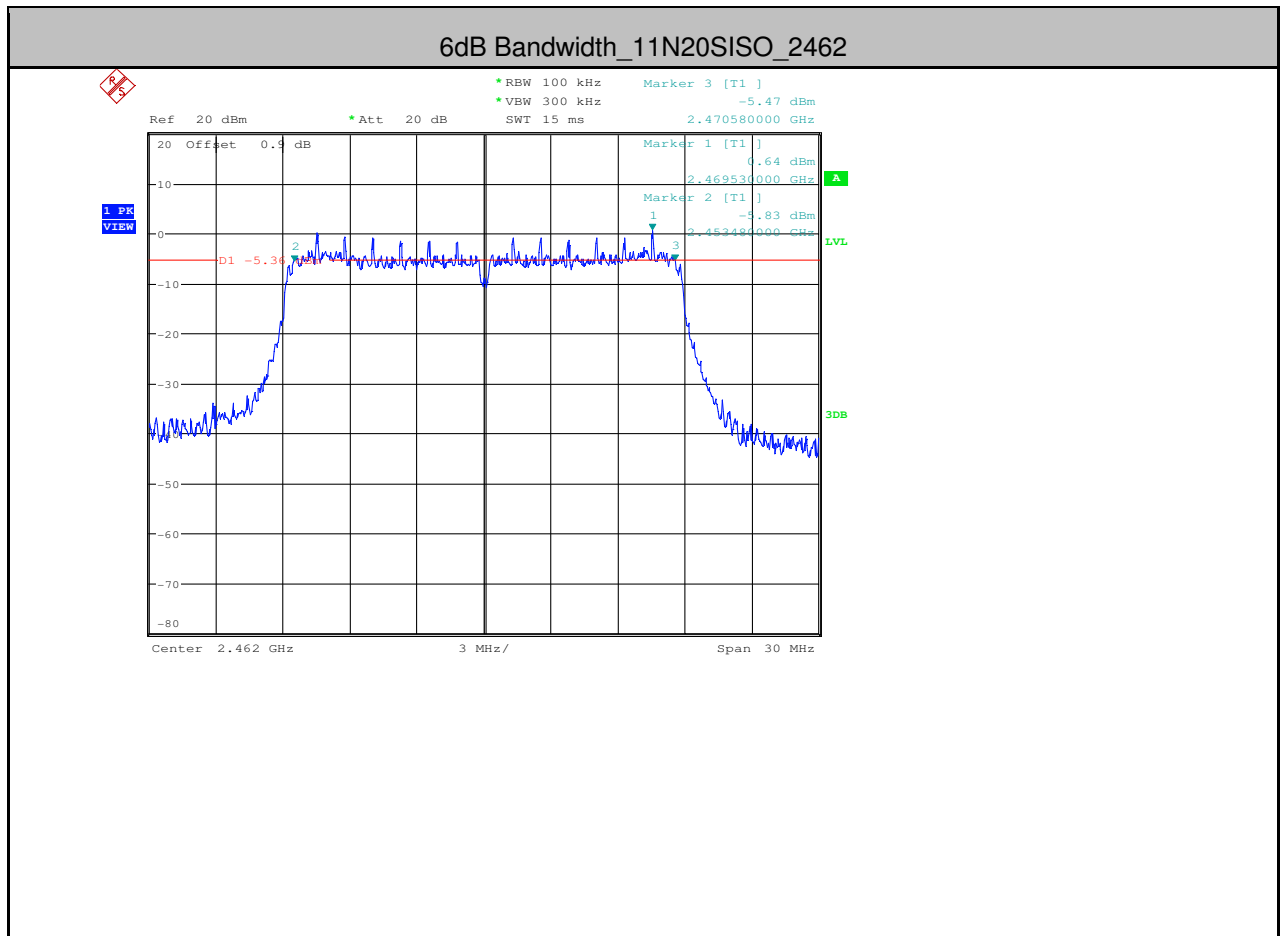


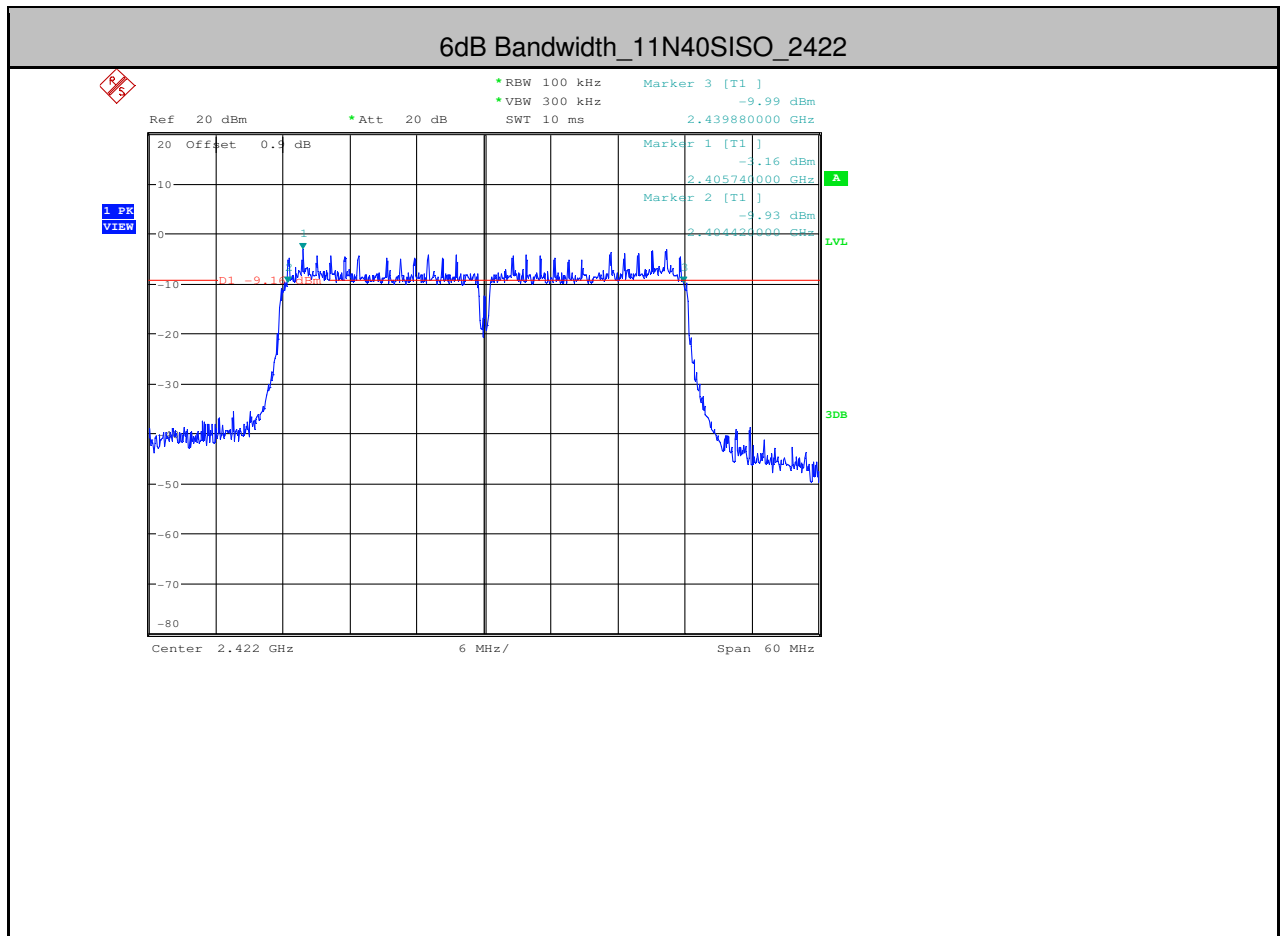


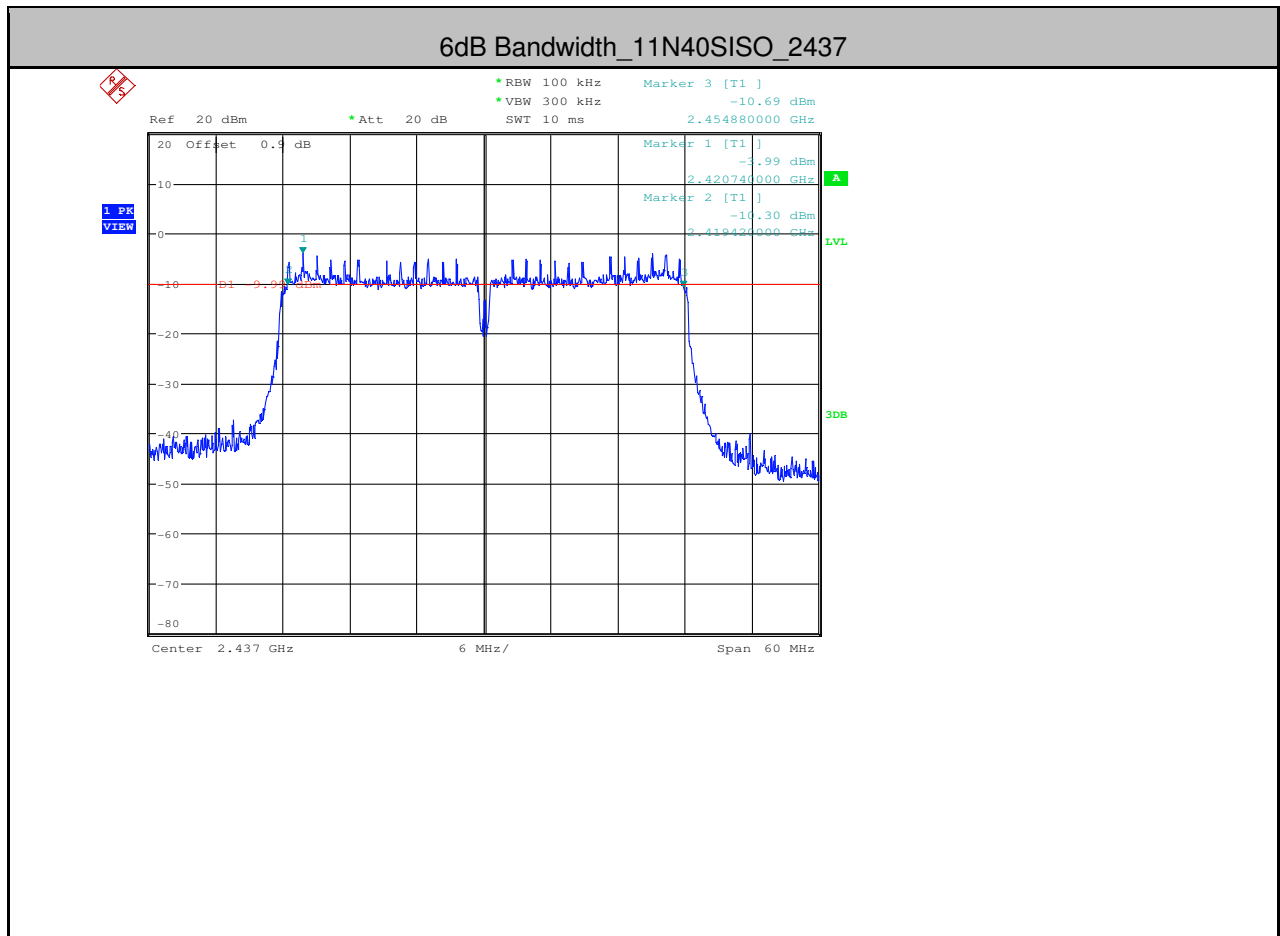


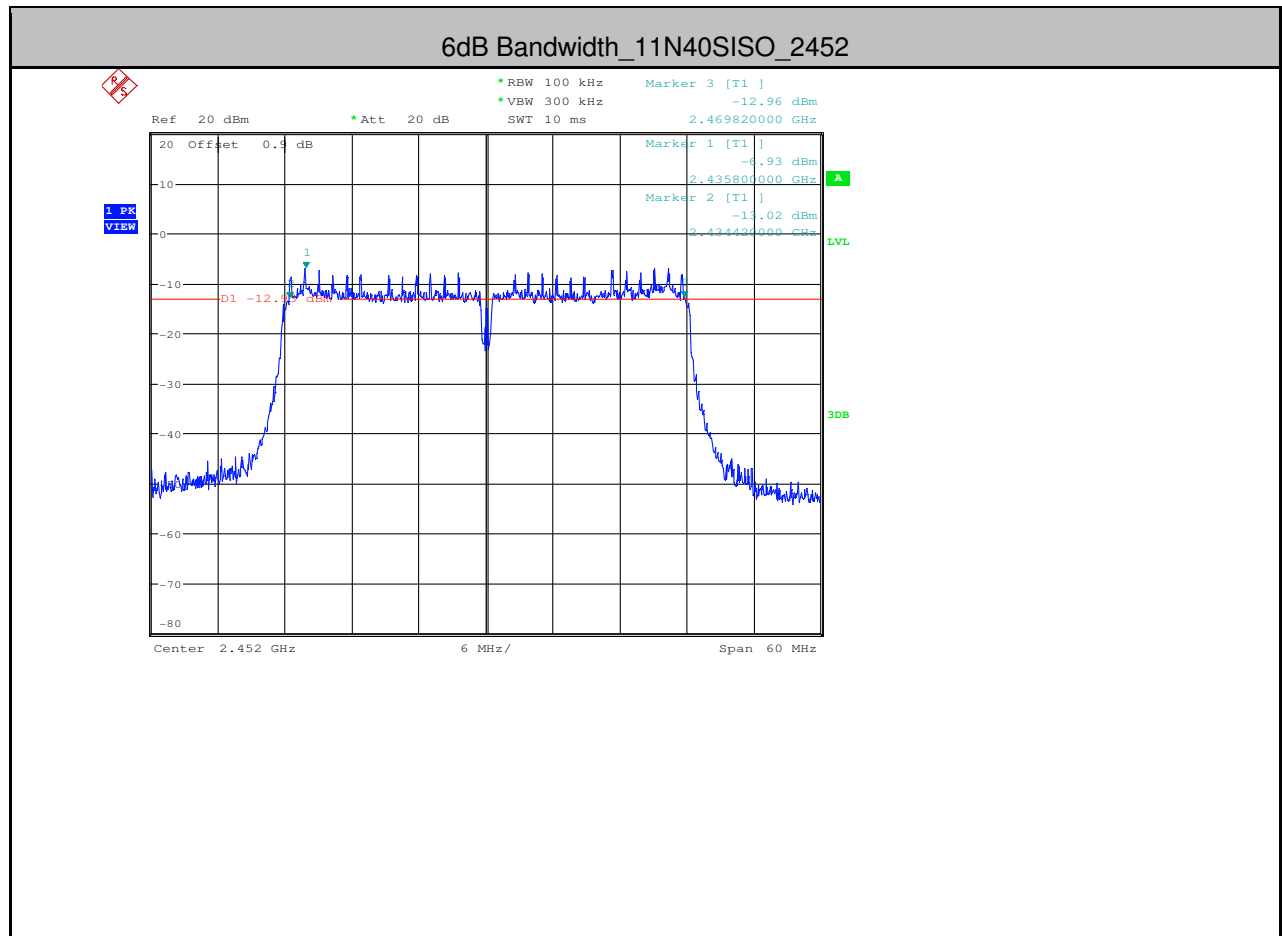








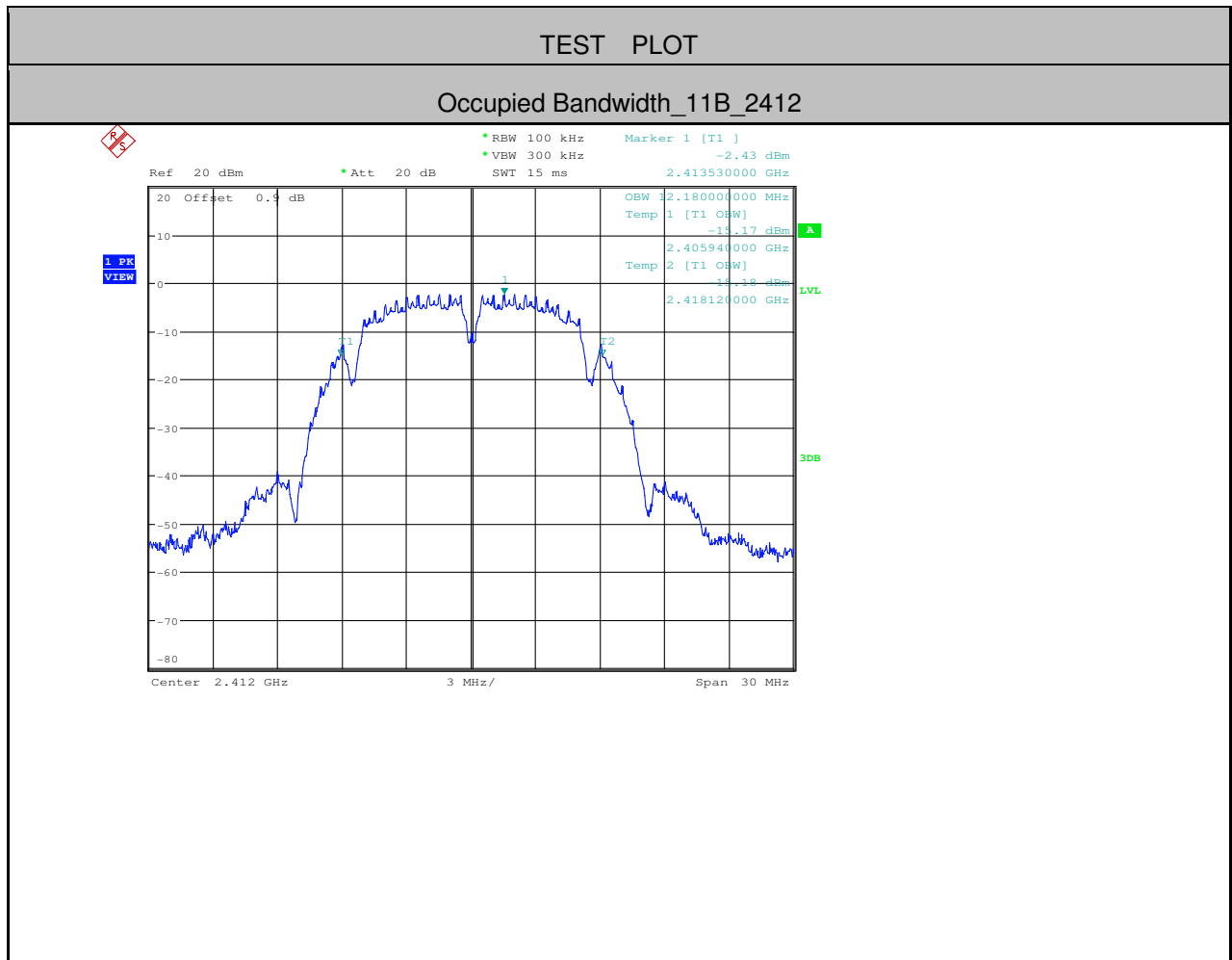


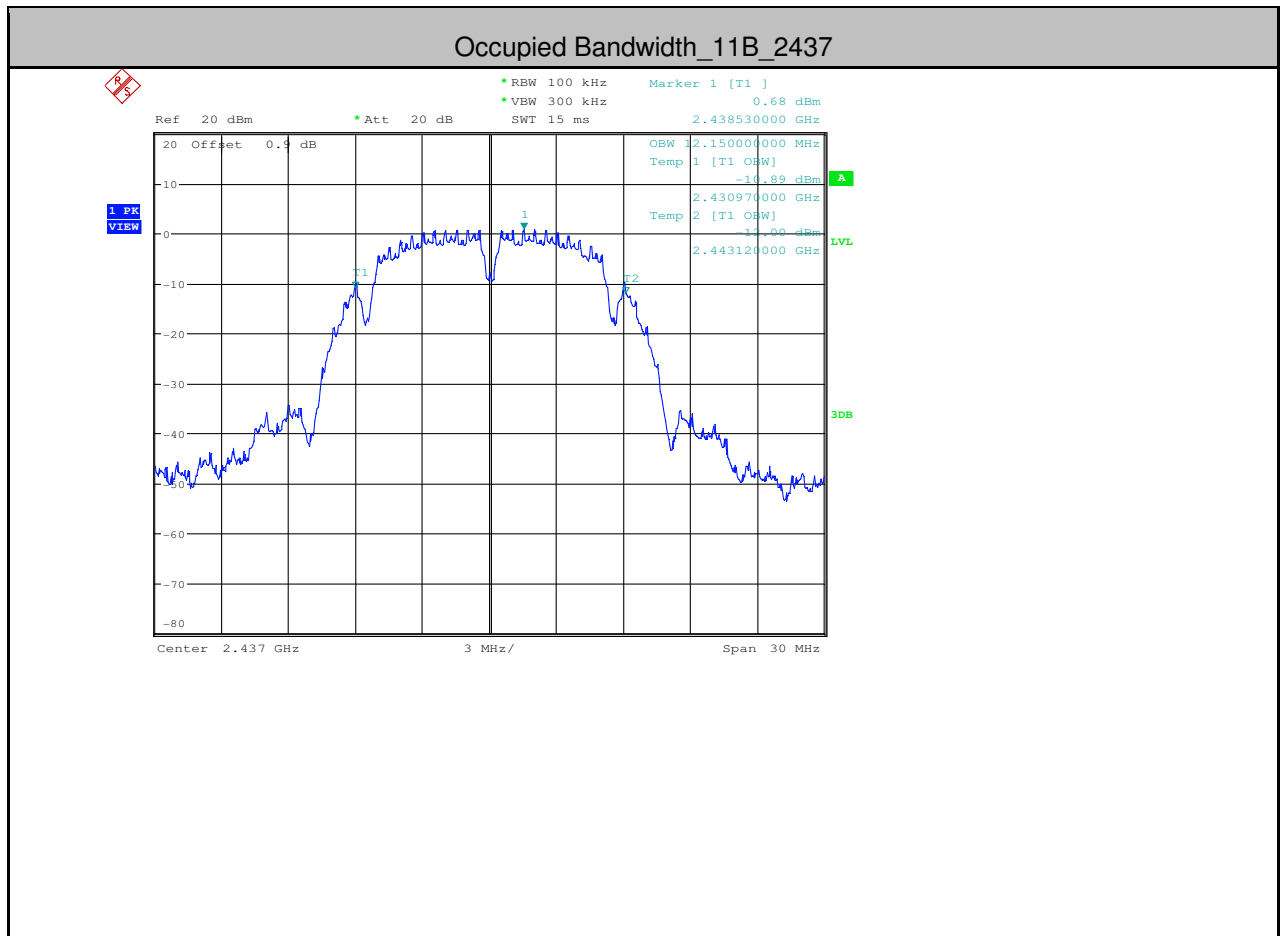


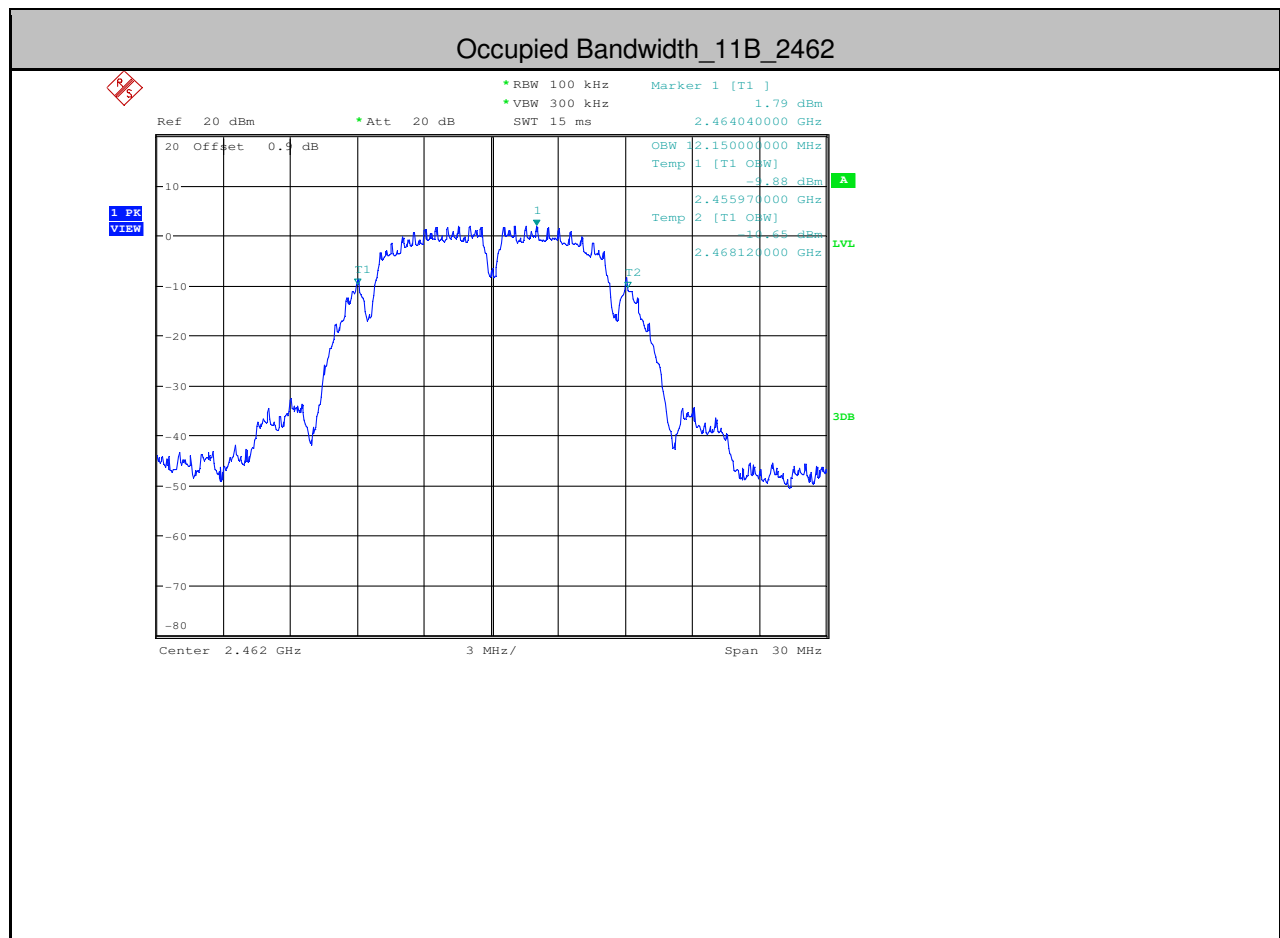


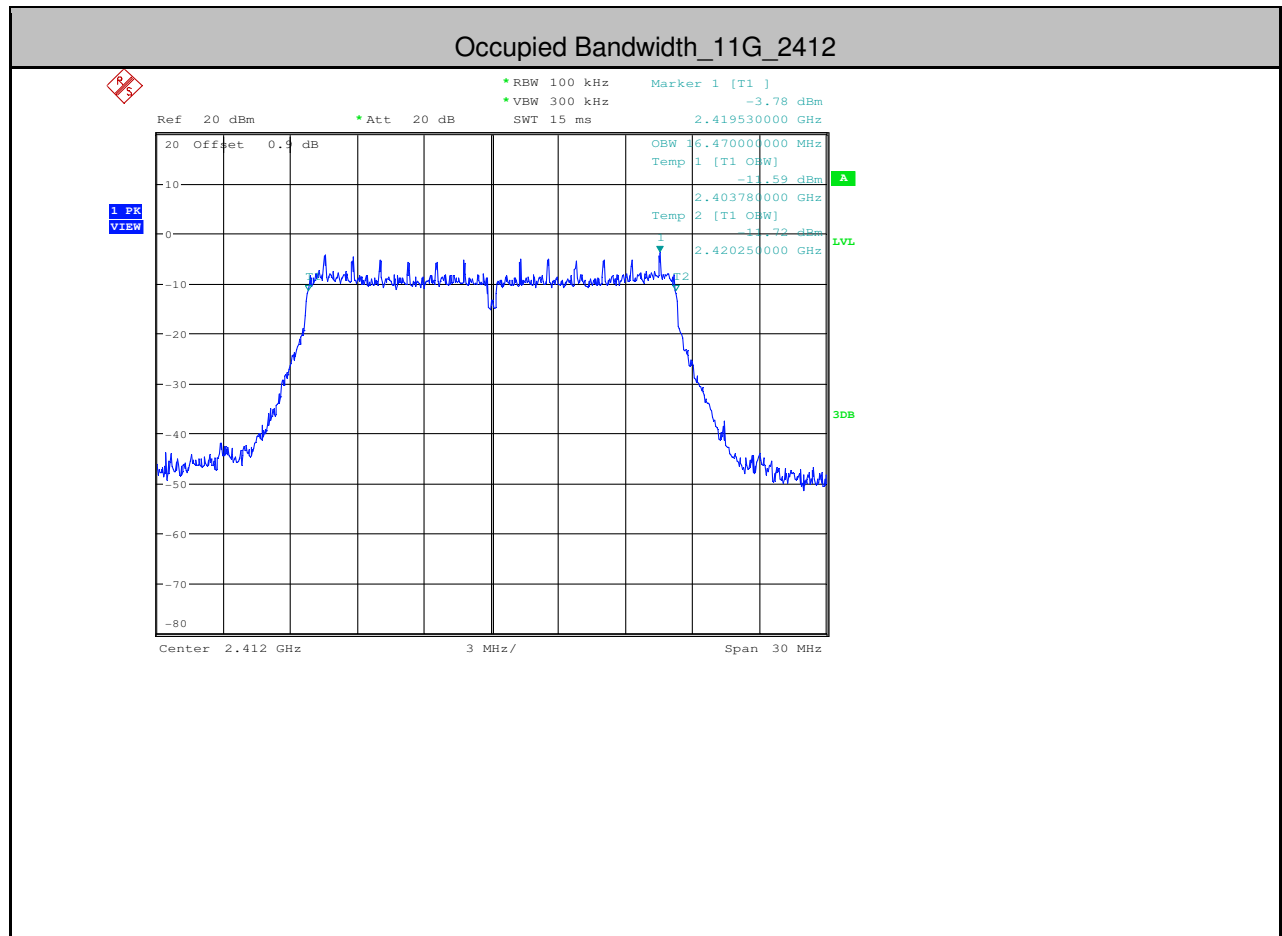
2.Occupied Bandwidth

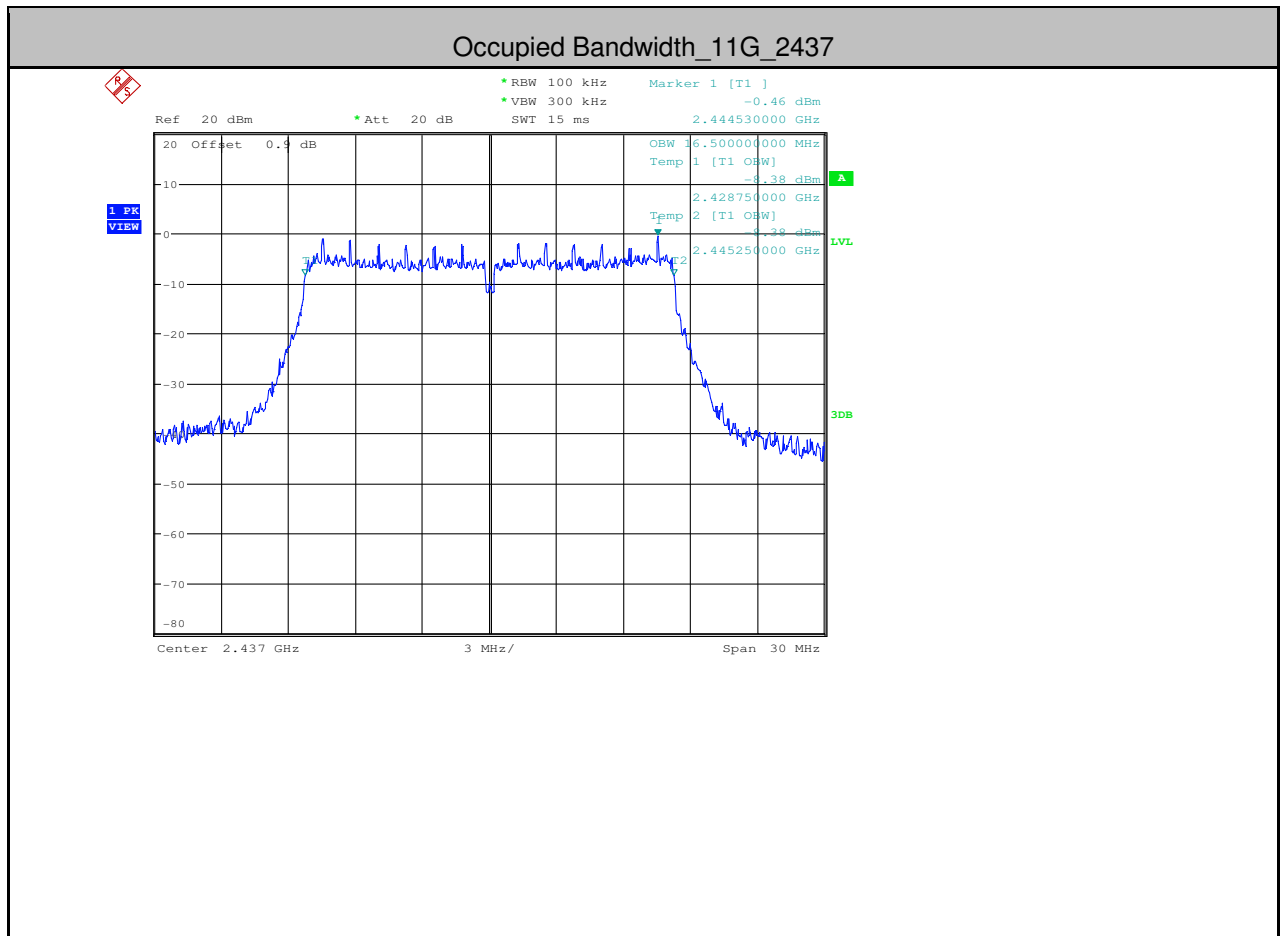
Test Mode	Test Channel	OBW[MHz]	Limit[MHz]	Verdict
11B	2412	12.180	---	PASS
11B	2437	12.150	---	PASS
11B	2462	12.150	---	PASS
11G	2412	16.470	---	PASS
11G	2437	16.500	---	PASS
11G	2462	16.500	---	PASS
11N20SISO	2412	17.550	---	PASS
11N20SISO	2437	17.550	---	PASS
11N20SISO	2462	17.550	---	PASS
11N40SISO	2422	35.940	---	PASS
11N40SISO	2437	35.940	---	PASS
11N40SISO	2452	36.000	---	PASS

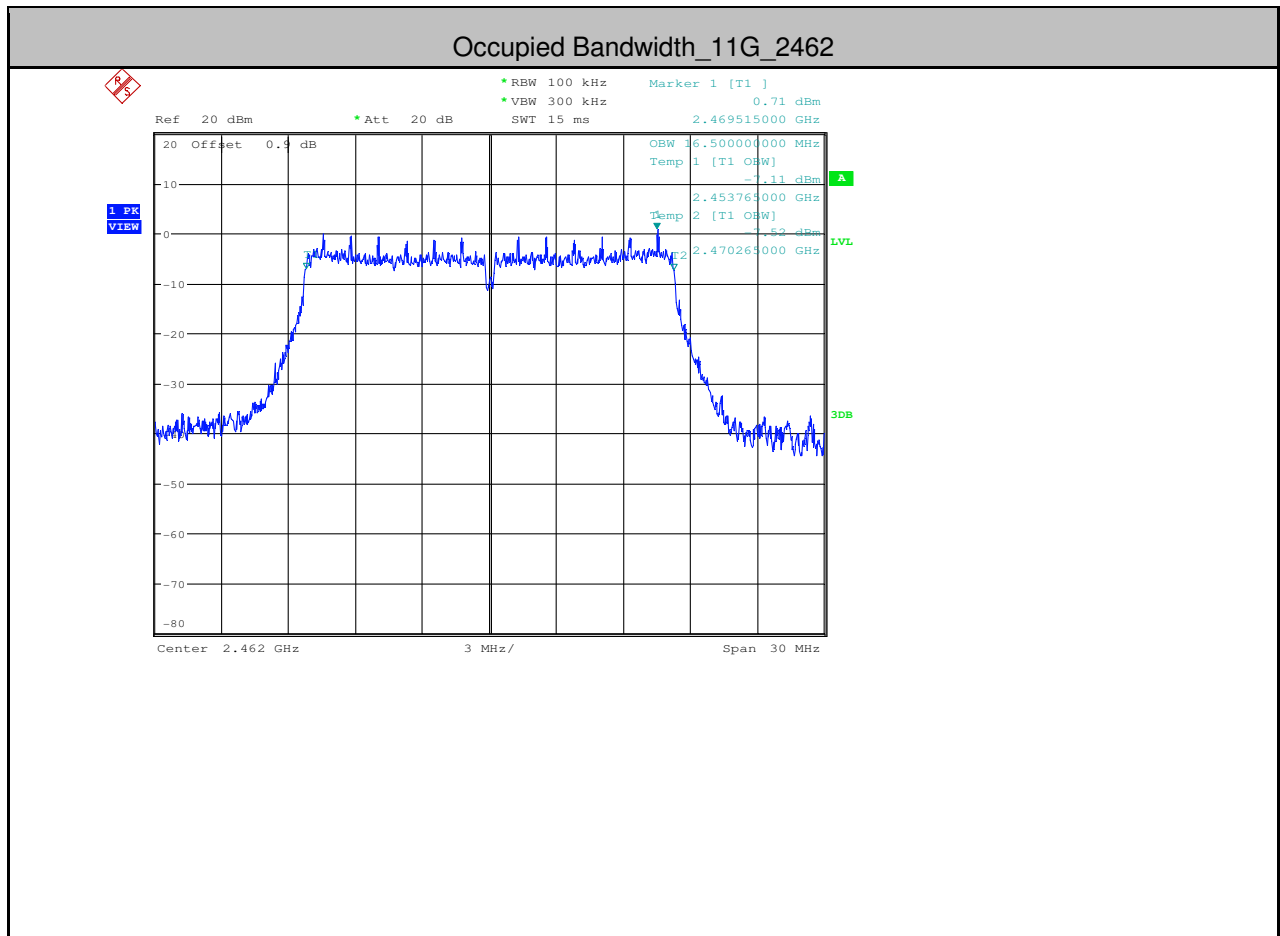


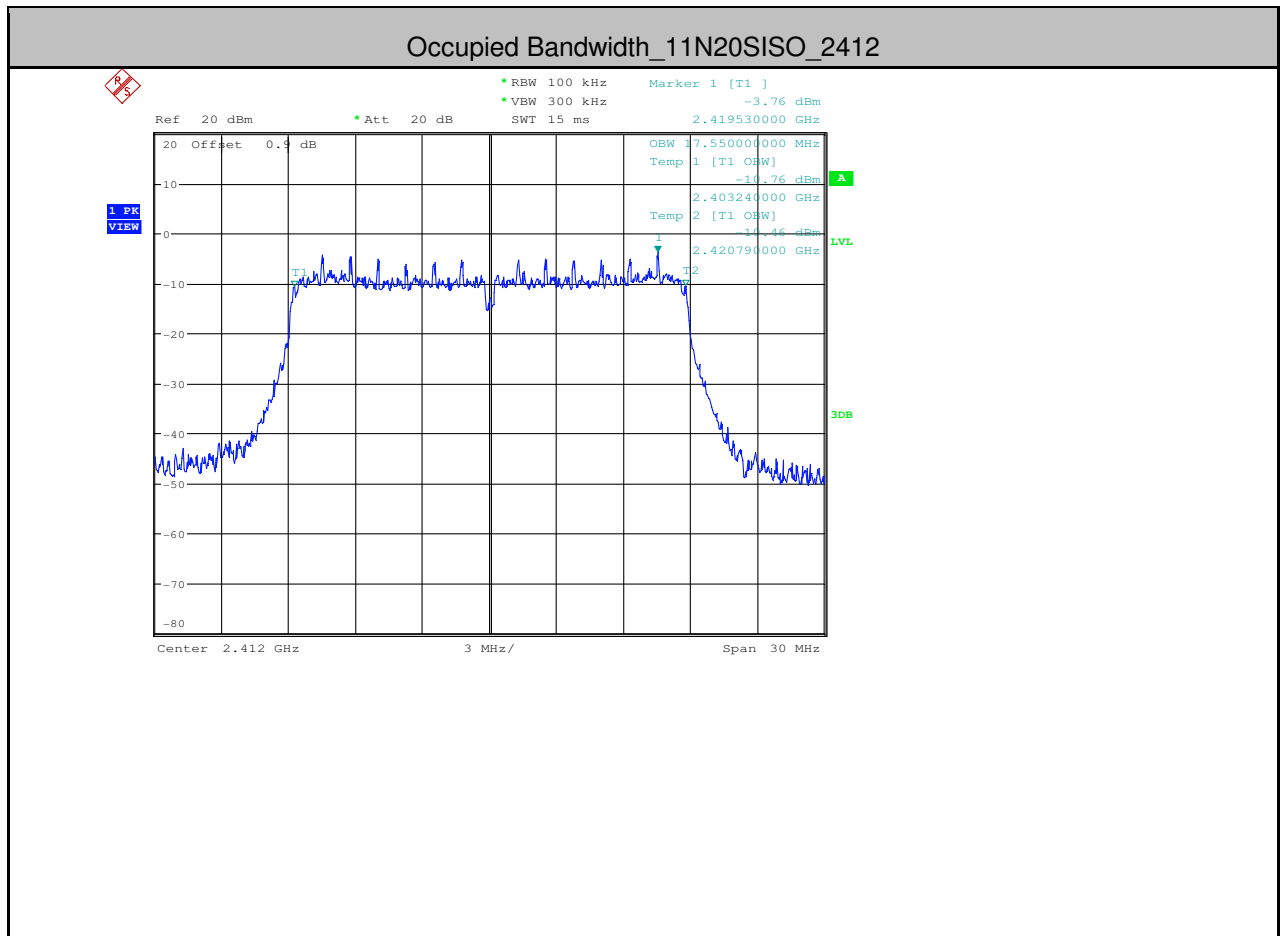


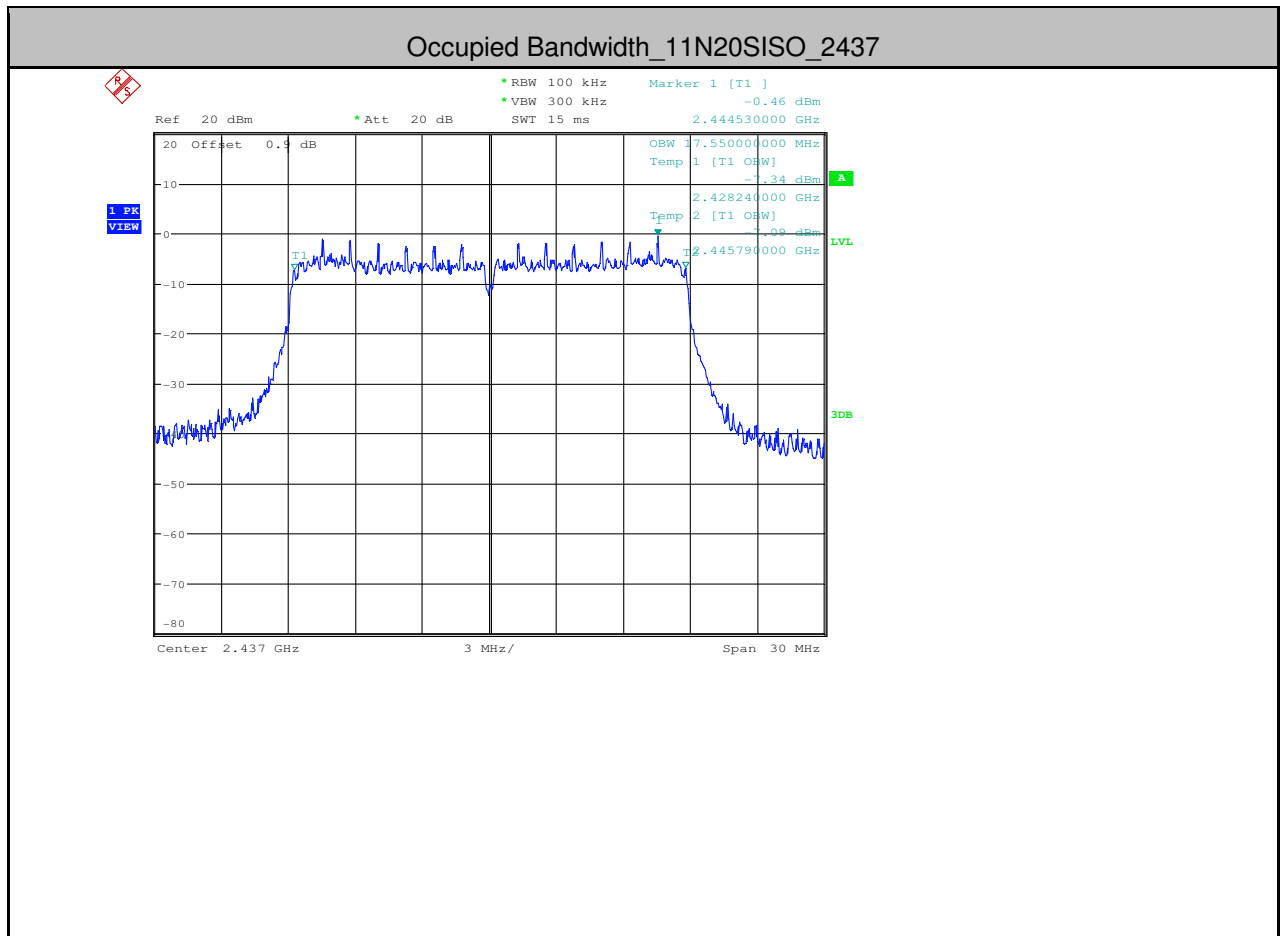


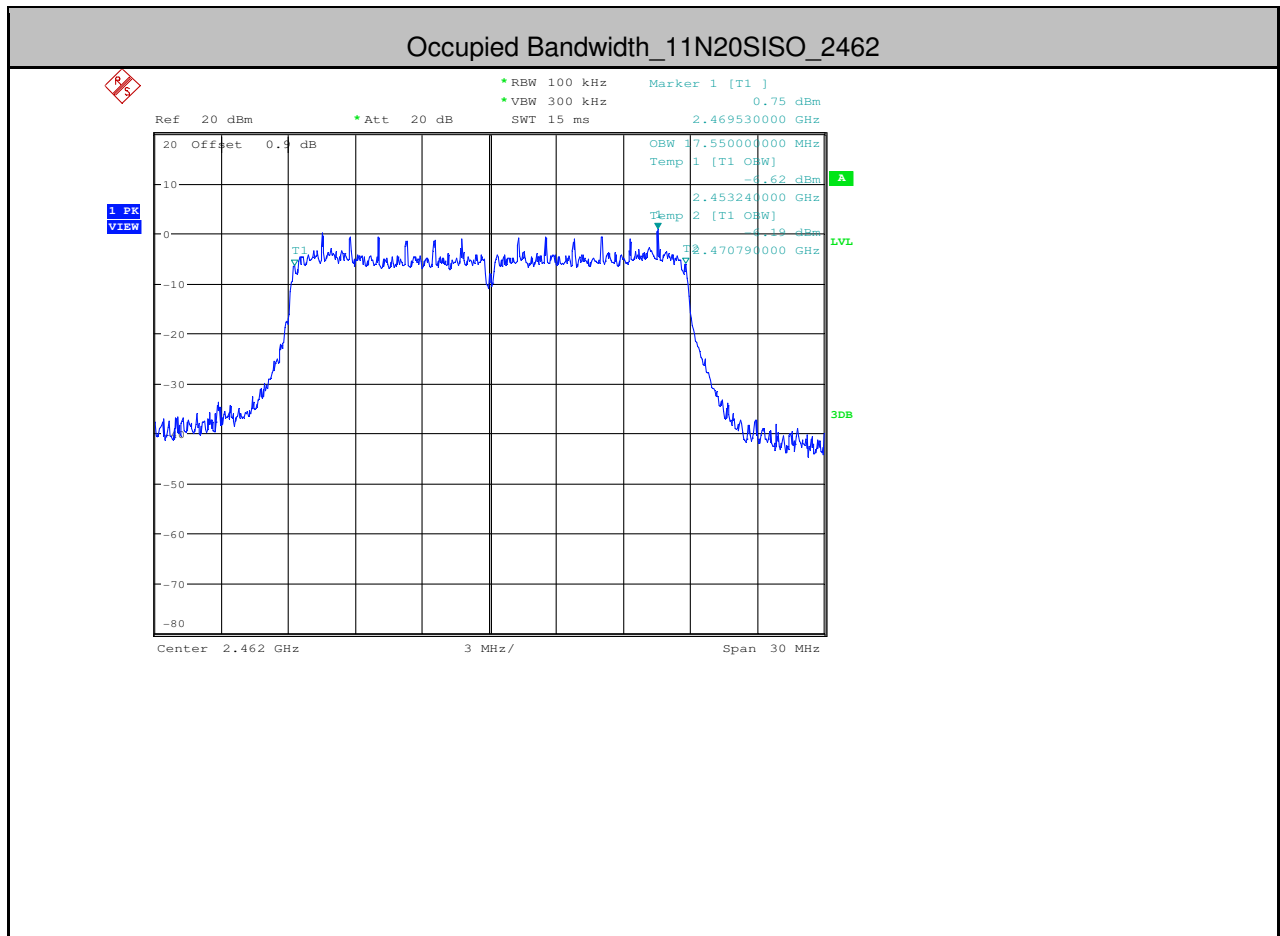


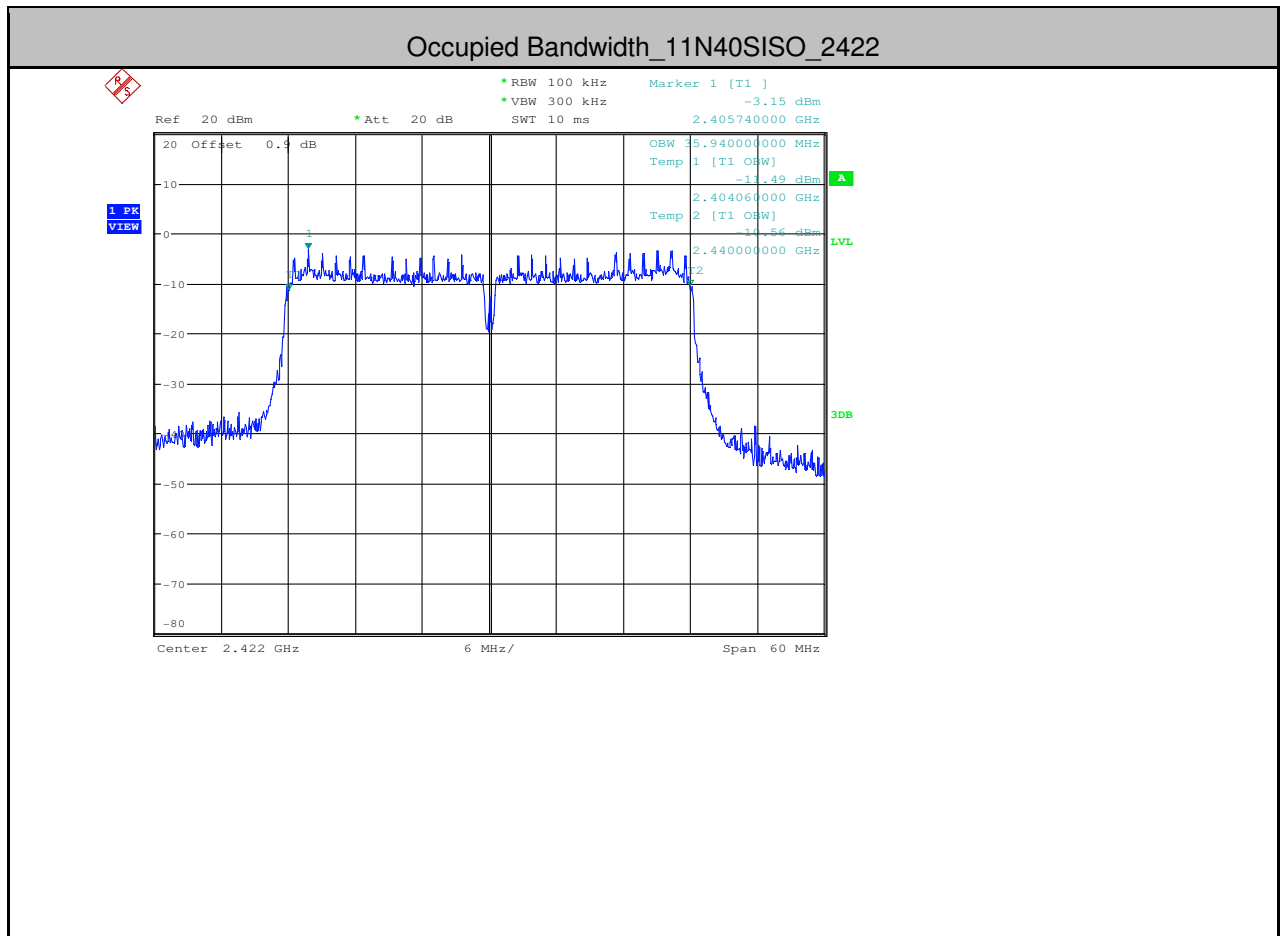


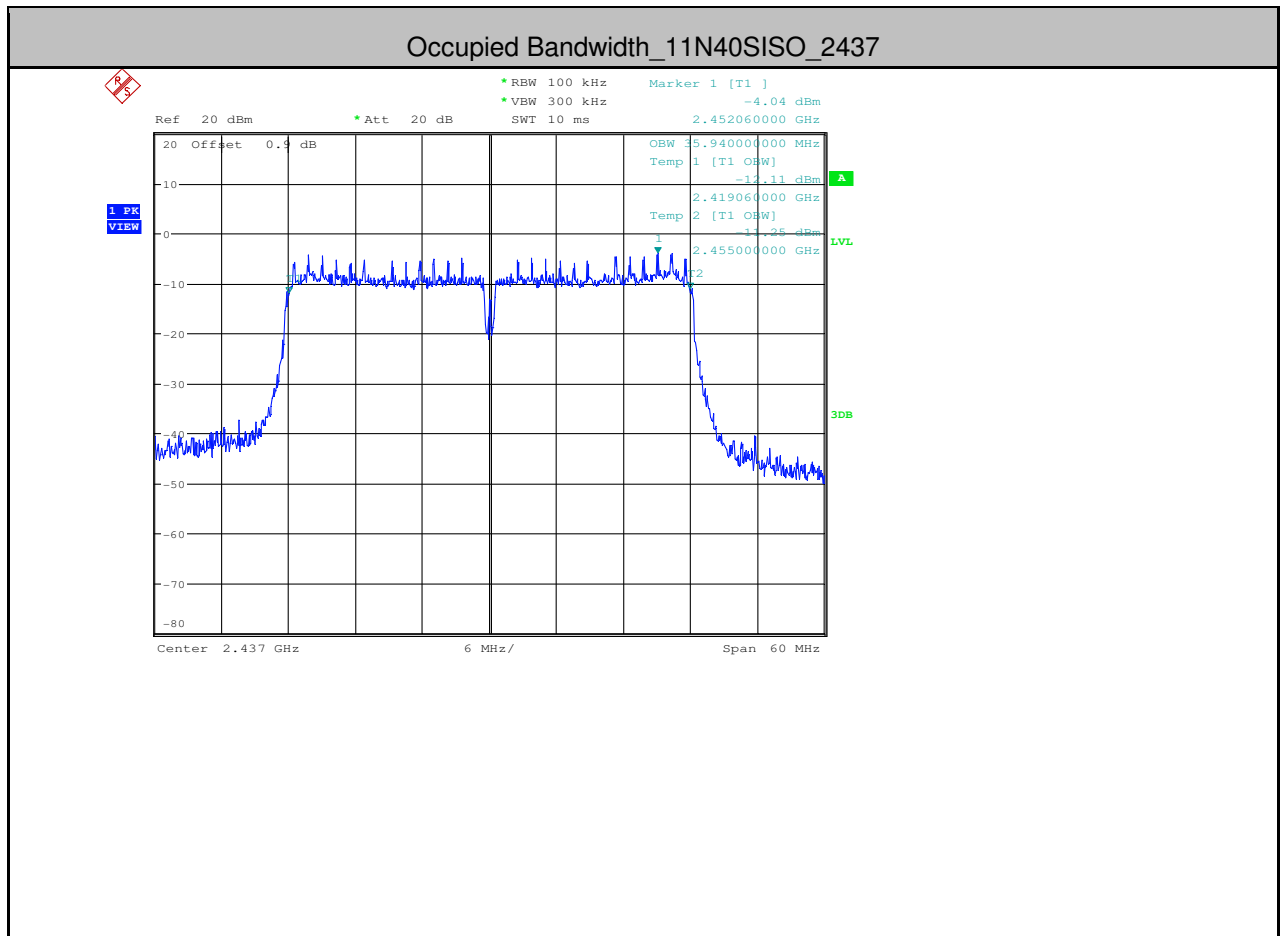


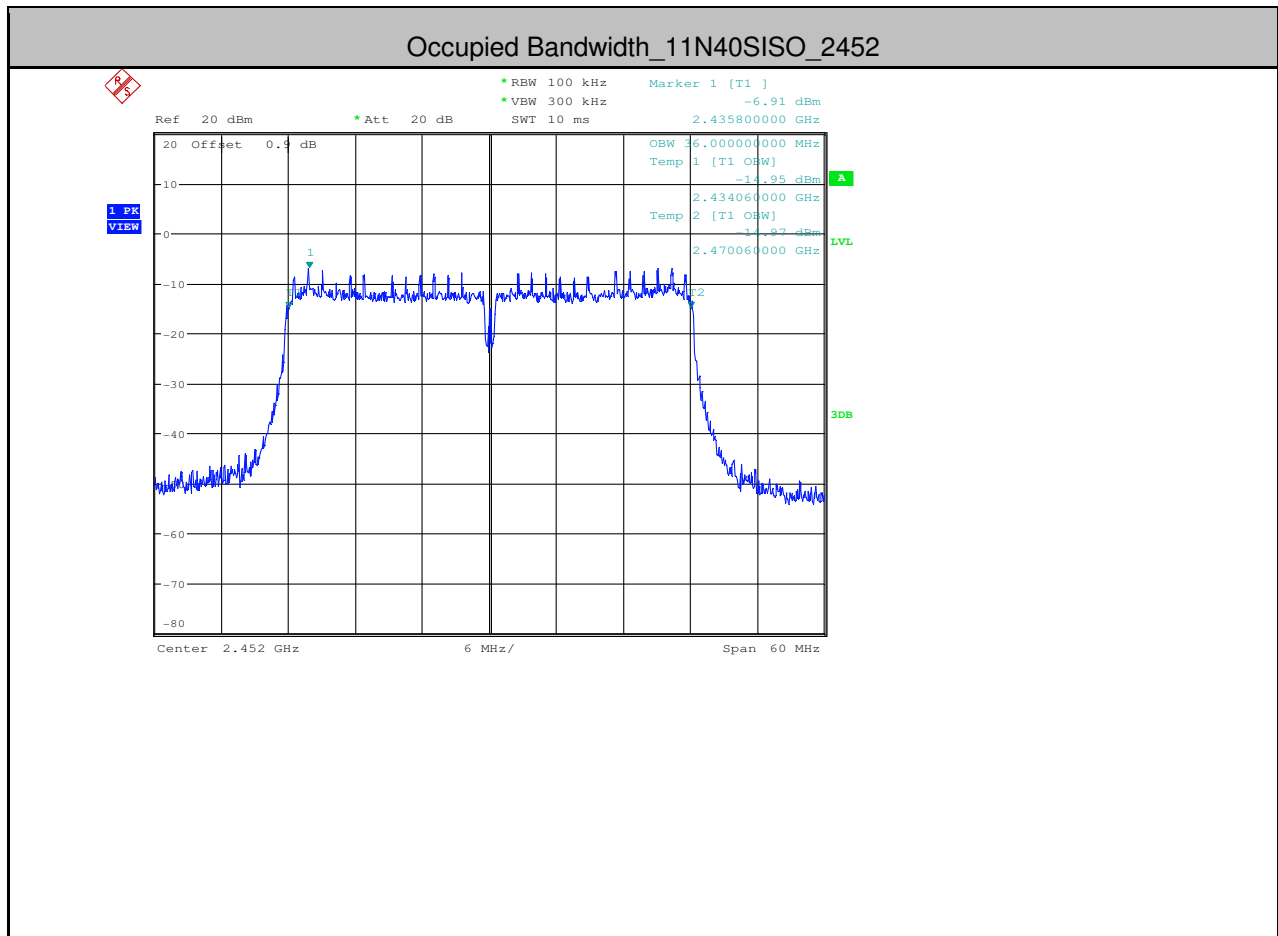














3.Maximum peak conducted output power

Pre-scan under all rate								
Mode	802.11b							
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps				
Power (dBm)	16.18	16.15	16.14	16.11				
Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power (dBm)	19.6	19.58	19.56	19.53	19.51	19.49	19.47	19.44
Mode	802.11n(HT20)							
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps
Power (dBm)	19.55	19.53	19.51	19.49	19.46	19.43	19.41	19.39
Mode	802.11n(HT40)							
Data Rate	13.5Mbps	27Mbps	40.5Mbps	54Mbps	81Mbps	108Mbps	121.5Mbps	135Mbps
Power (dBm)	18.93	18.91	18.86	18.81	18.79	18.76	18.73	18.71
Through Pre-scan, 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).								

Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
11B	2412	11.89	<30	PASS
11B	2437	15.03	<30	PASS
11B	2462	16.18	<30	PASS
11G	2412	15.19	<30	PASS
11G	2437	18.45	<30	PASS
11G	2462	19.6	<30	PASS
11N20SISO	2412	15.21	<30	PASS
11N20SISO	2437	18.46	<30	PASS
11N20SISO	2462	19.55	<30	PASS
11N40SISO	2422	18.93	<30	PASS



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11N40SISO	2437	18.14	<30	PASS
11N40SISO	2452	15.27	<30	PASS



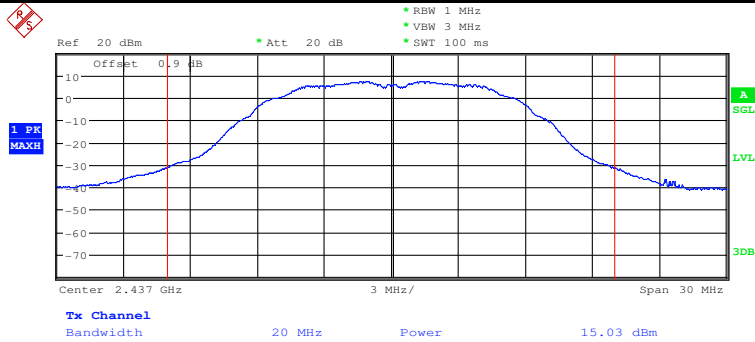
TEST PLOT

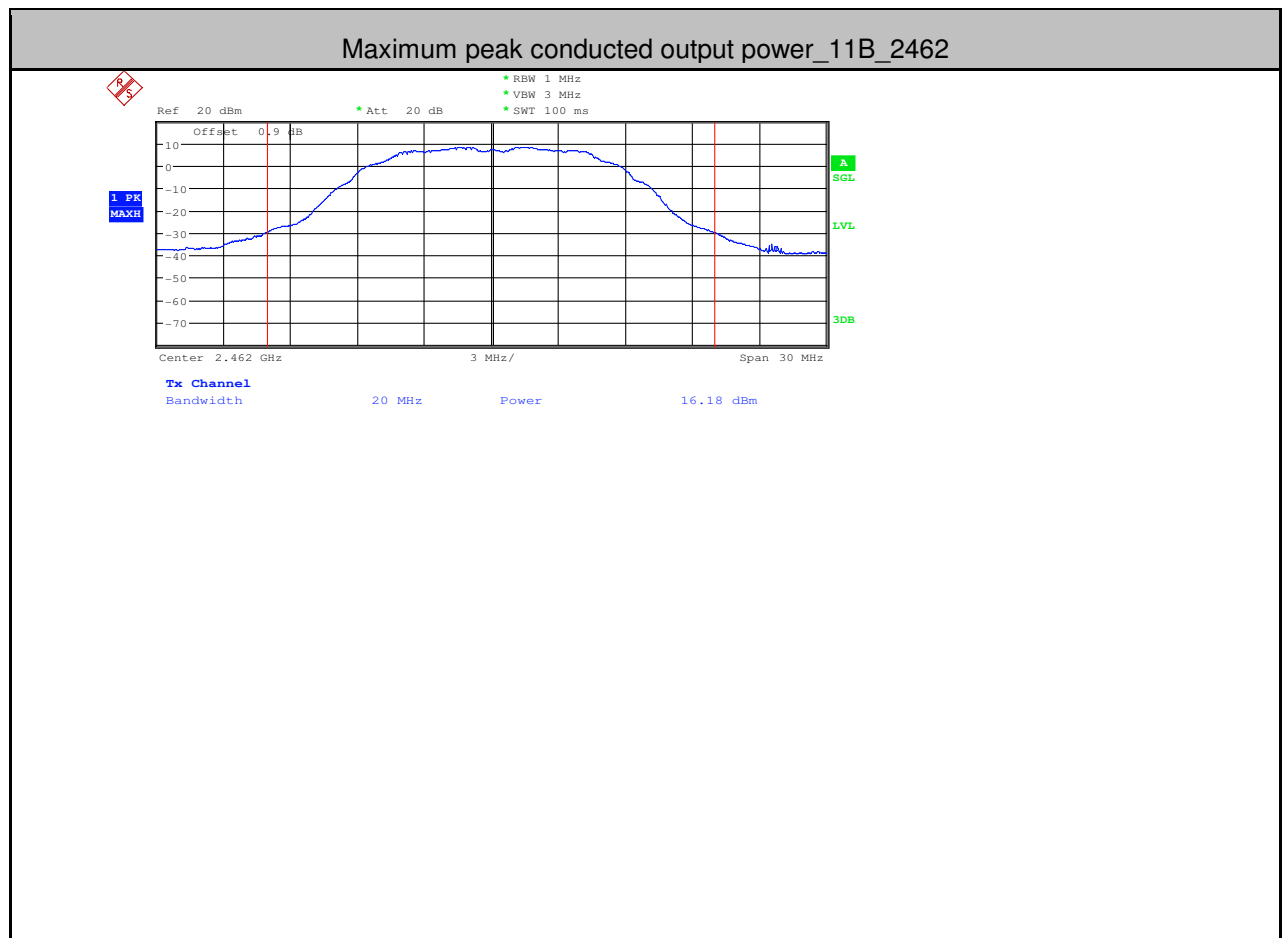
Maximum peak conducted output power_11B_2412





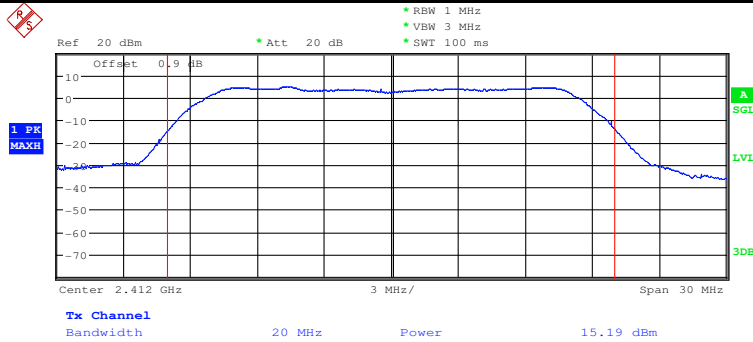
Maximum peak conducted output power_11B_2437





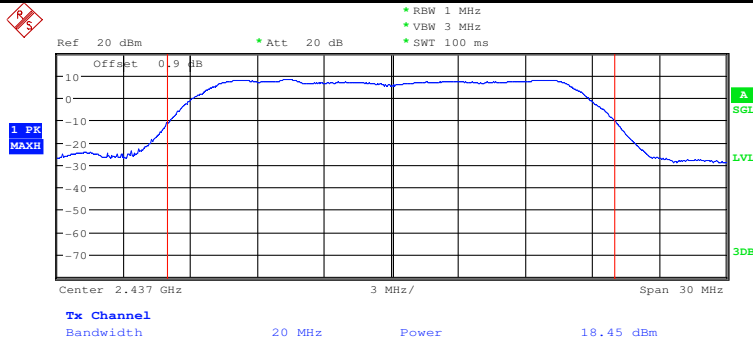


Maximum peak conducted output power_11G_2412



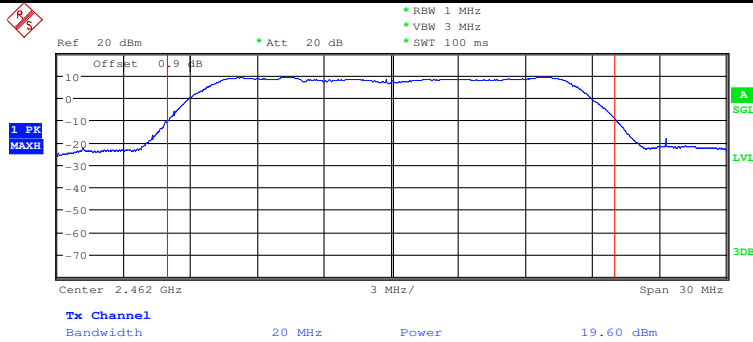


Maximum peak conducted output power_11G_2437



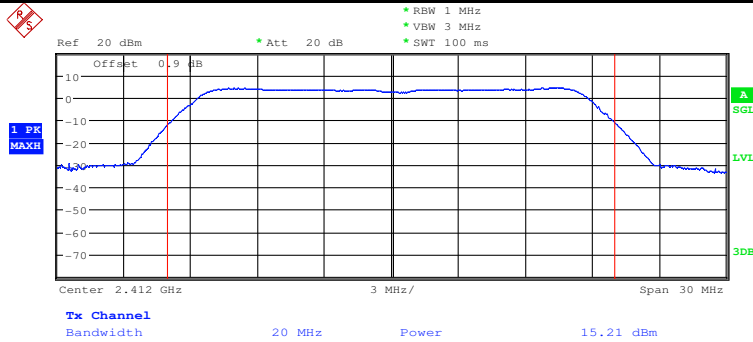


Maximum peak conducted output power_11G_2462



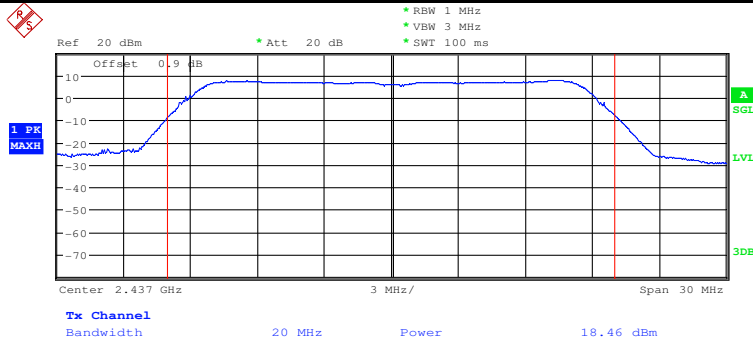


Maximum peak conducted output power_11N20SISO_2412



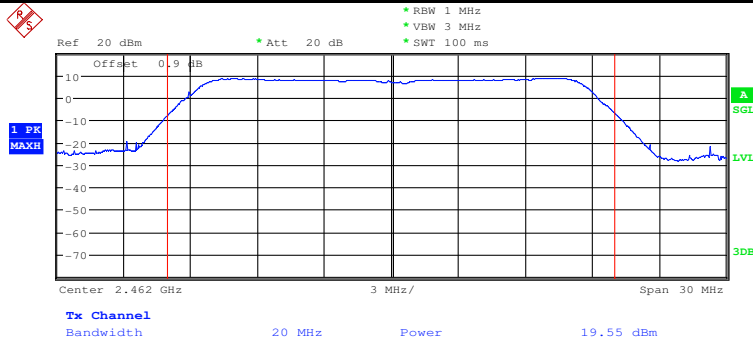


Maximum peak conducted output power_11N20SISO_2437



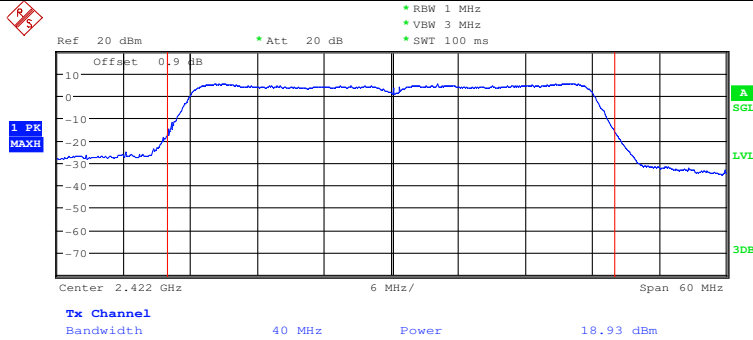


Maximum peak conducted output power_11N20SISO_2462



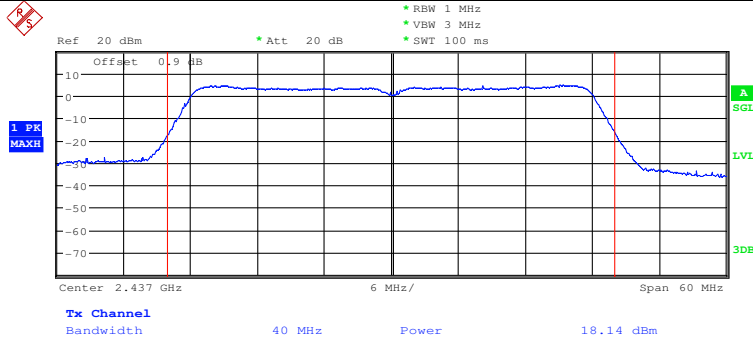


Maximum peak conducted output power_11N40SISO_2422



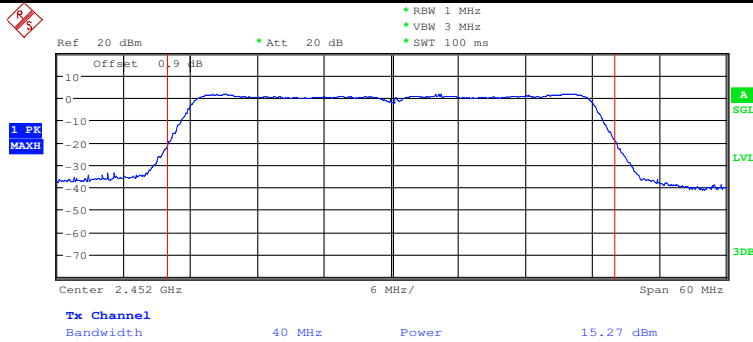


Maximum peak conducted output power_11N40SISO_2437





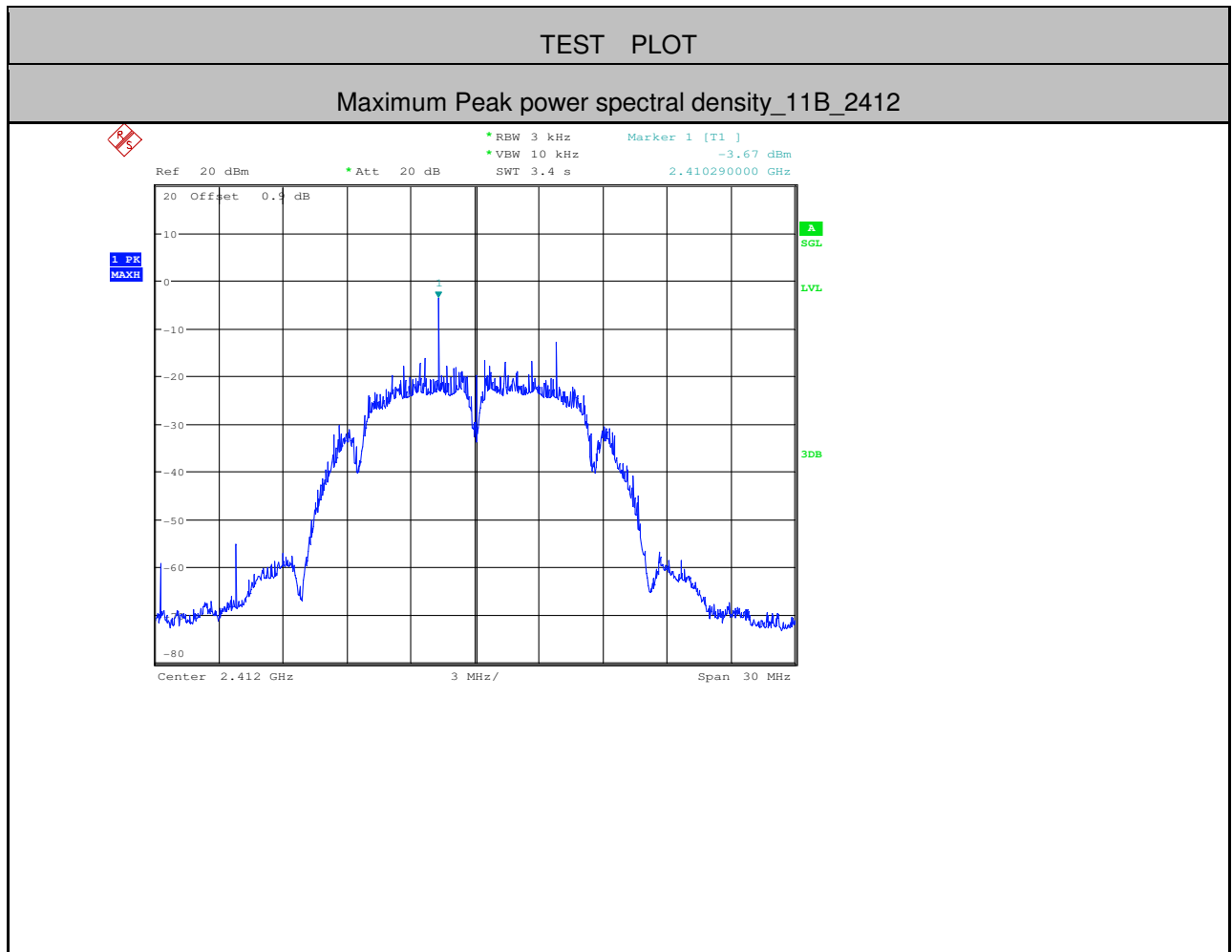
Maximum peak conducted output power_11N40SISO_2452

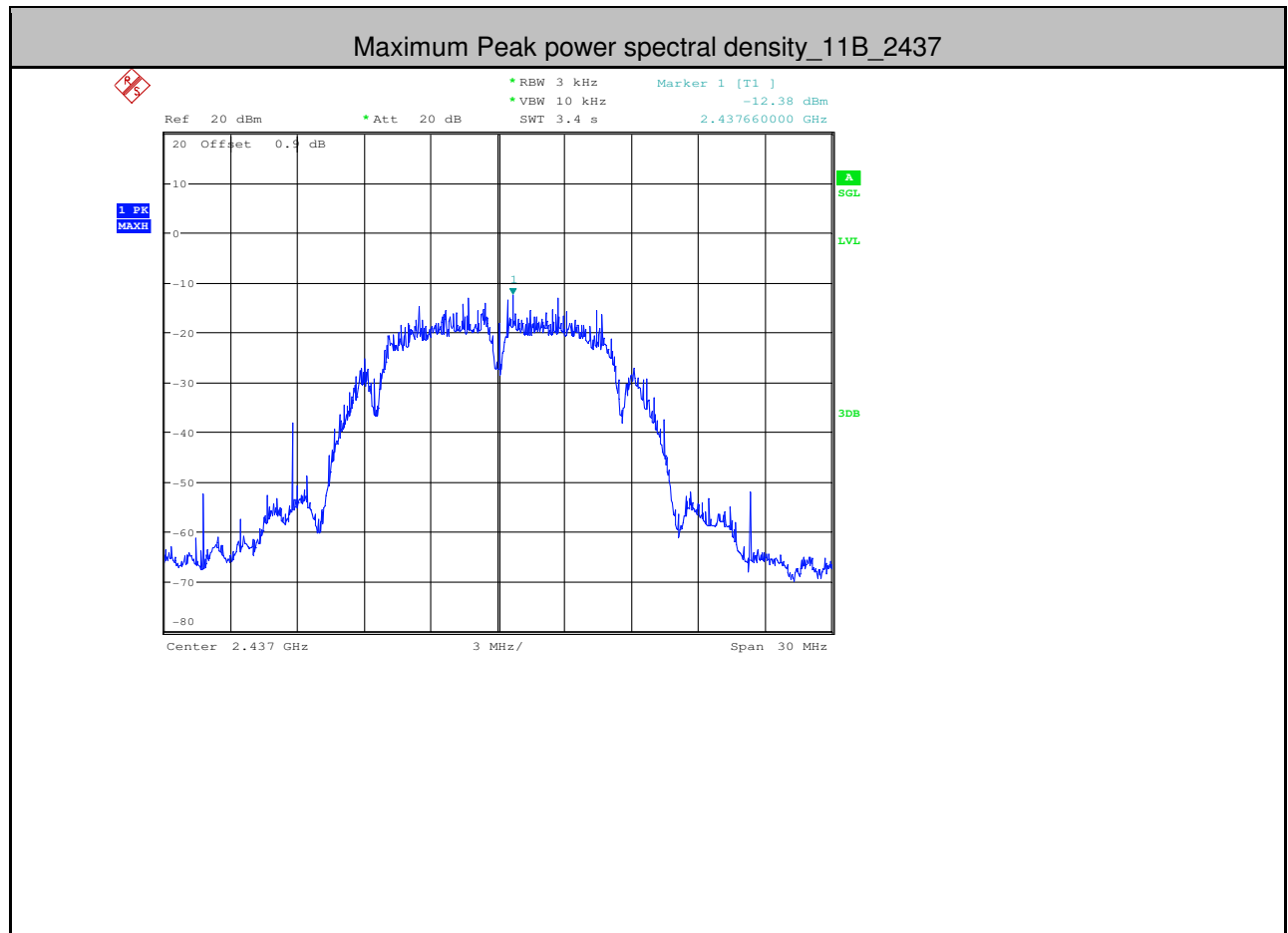


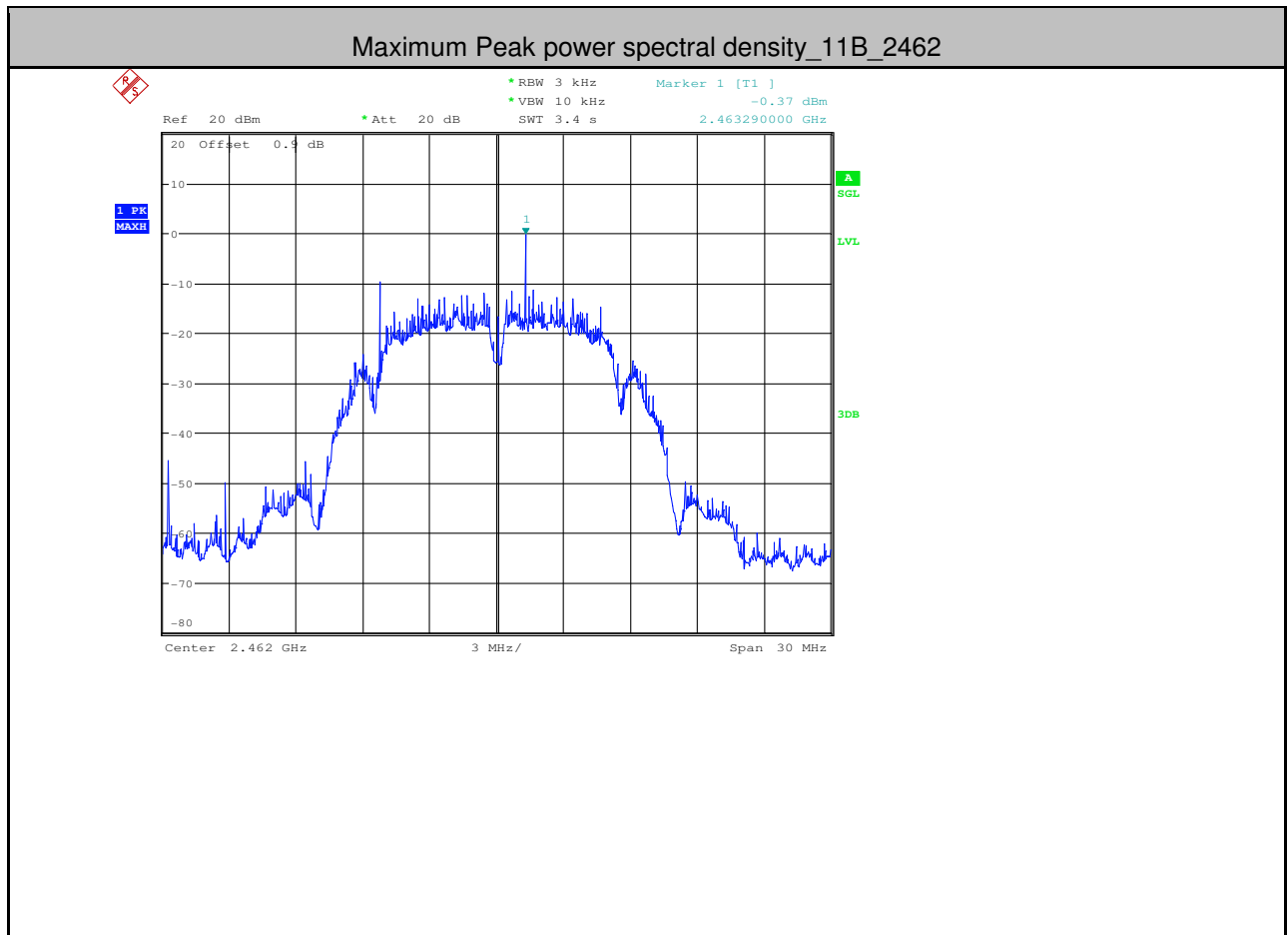


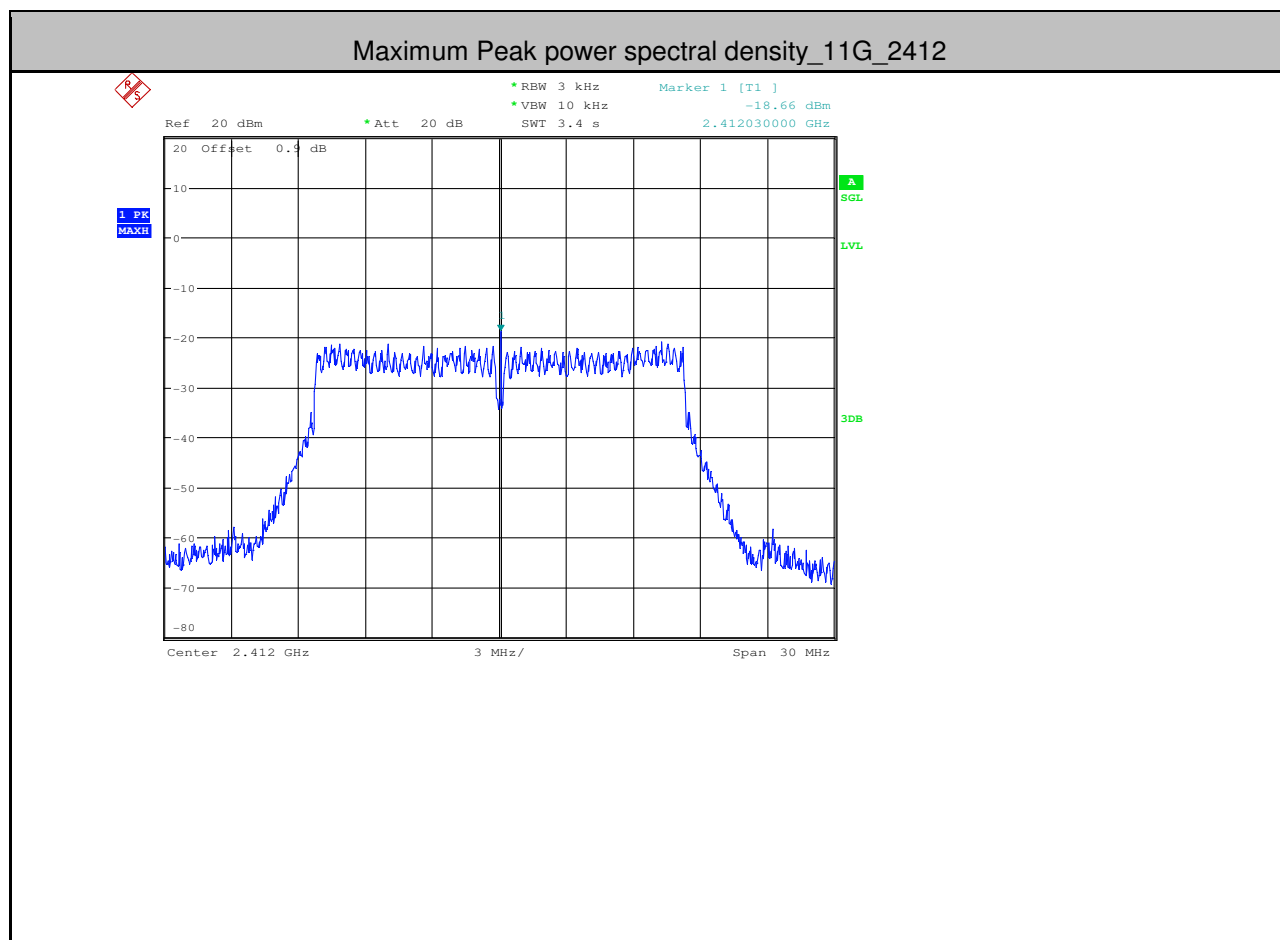
4. Maximum Peak power spectral density

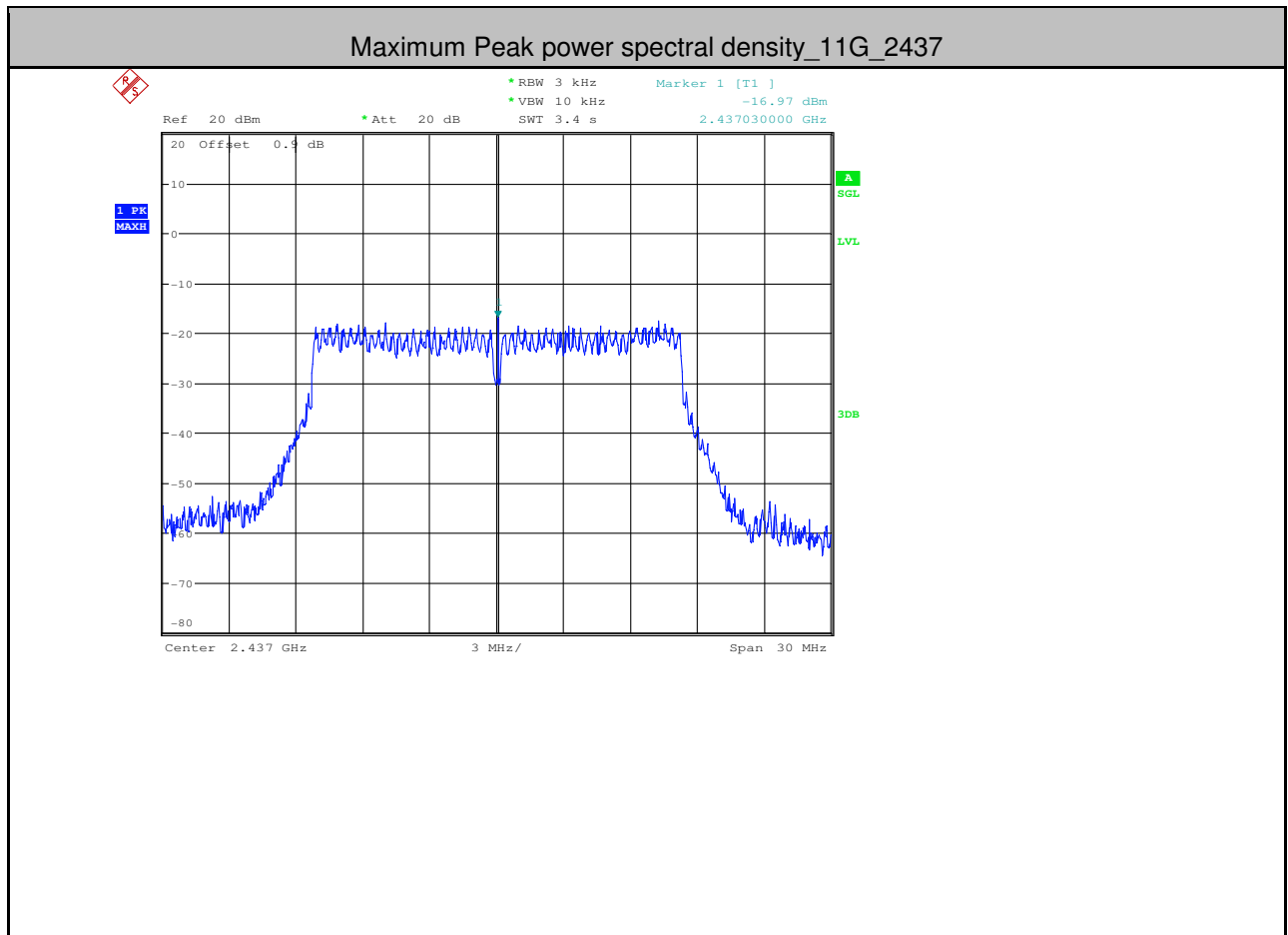
Test Mode	Test Channel	PSD[dBm/MHz]	Limit[dBm/MHz]	Verdict
11B	2412	-3.67	<8.00	PASS
11B	2437	-12.38	<8.00	PASS
11B	2462	-0.37	<8.00	PASS
11G	2412	-18.66	<8.00	PASS
11G	2437	-16.97	<8.00	PASS
11G	2462	-15.71	<8.00	PASS
11N20SISO	2412	-18.4	<8.00	PASS
11N20SISO	2437	-16.77	<8.00	PASS
11N20SISO	2462	-15.52	<8.00	PASS
11N40SISO	2422	-15.96	<8.00	PASS
11N40SISO	2437	-16.74	<8.00	PASS
11N40SISO	2452	-17.64	<8.00	PASS

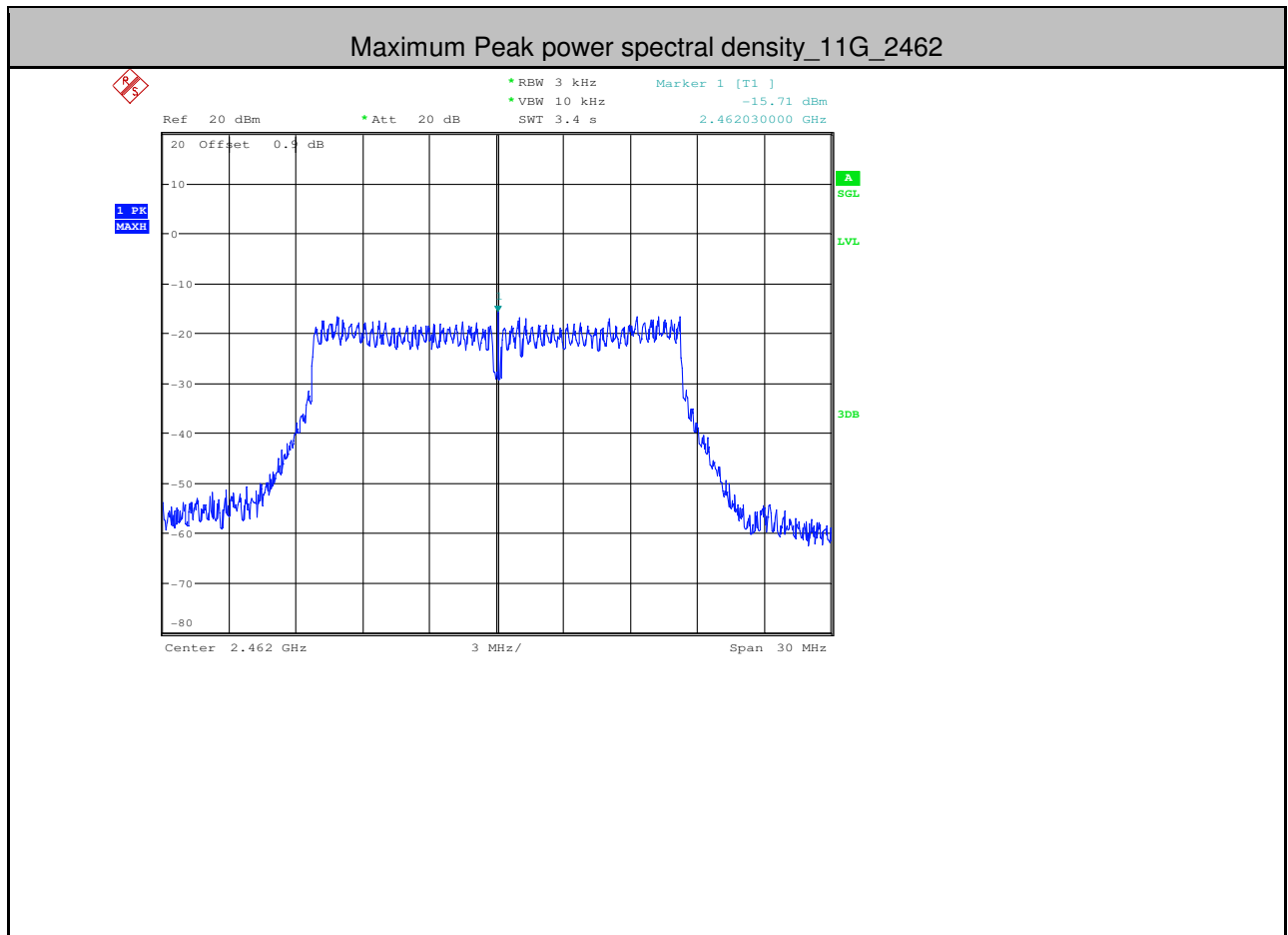


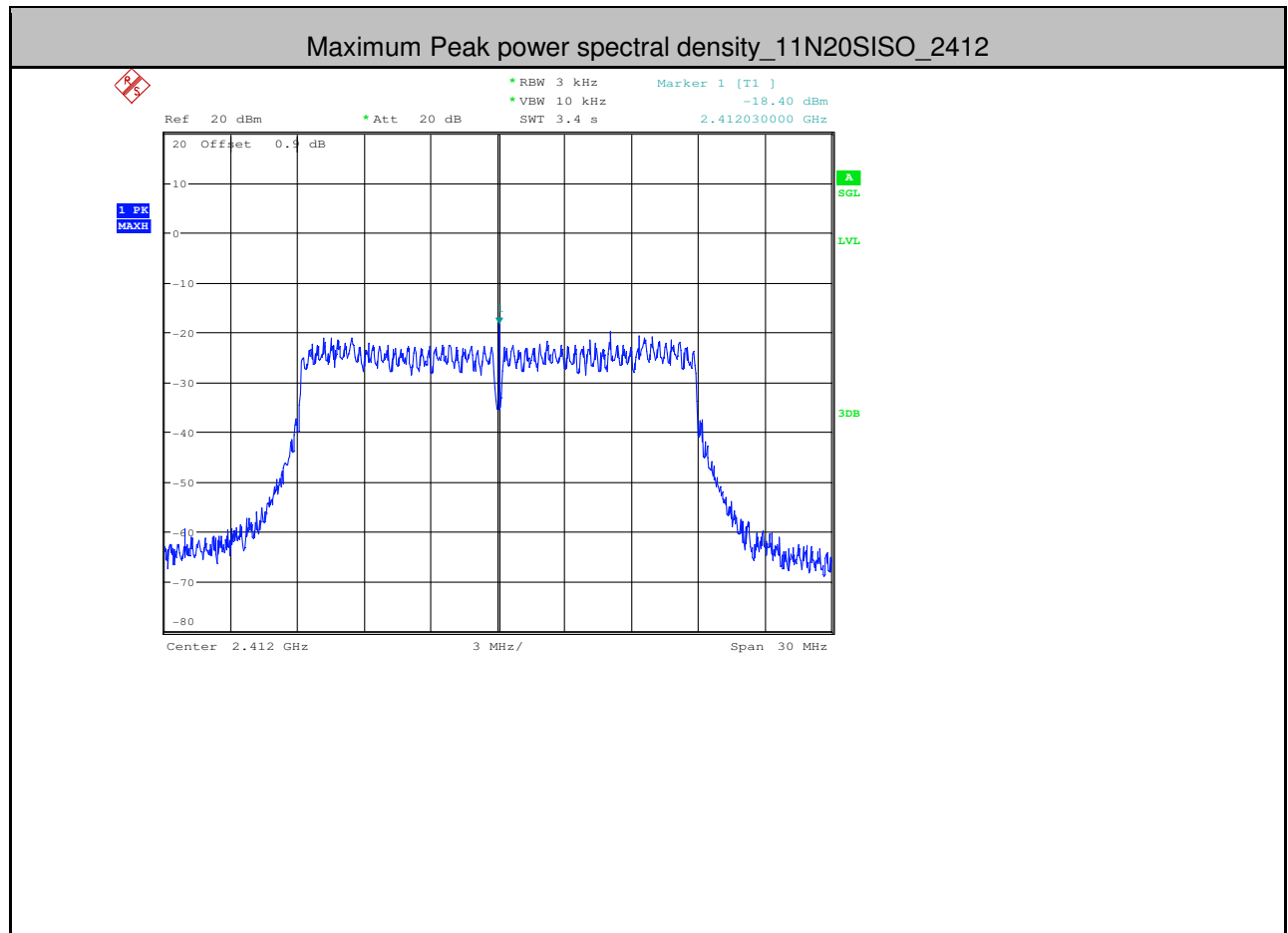






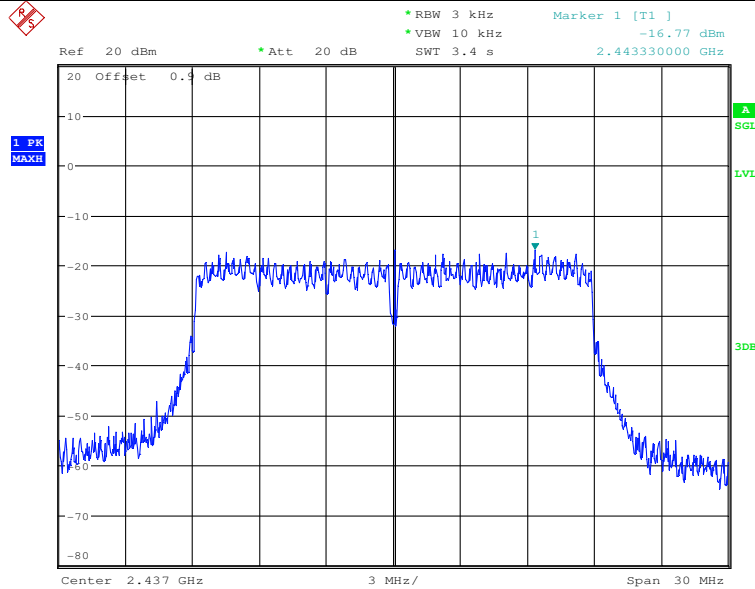


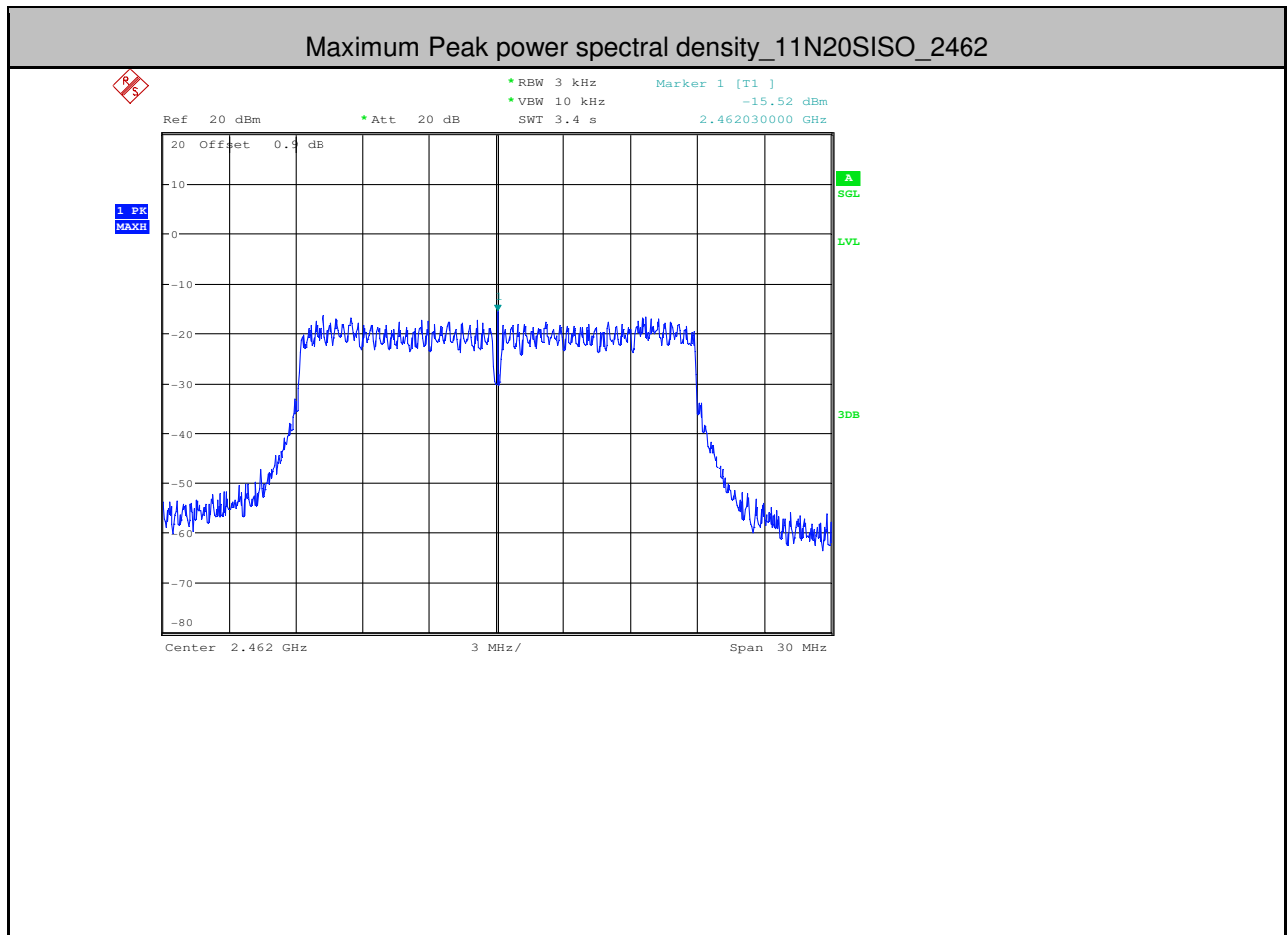


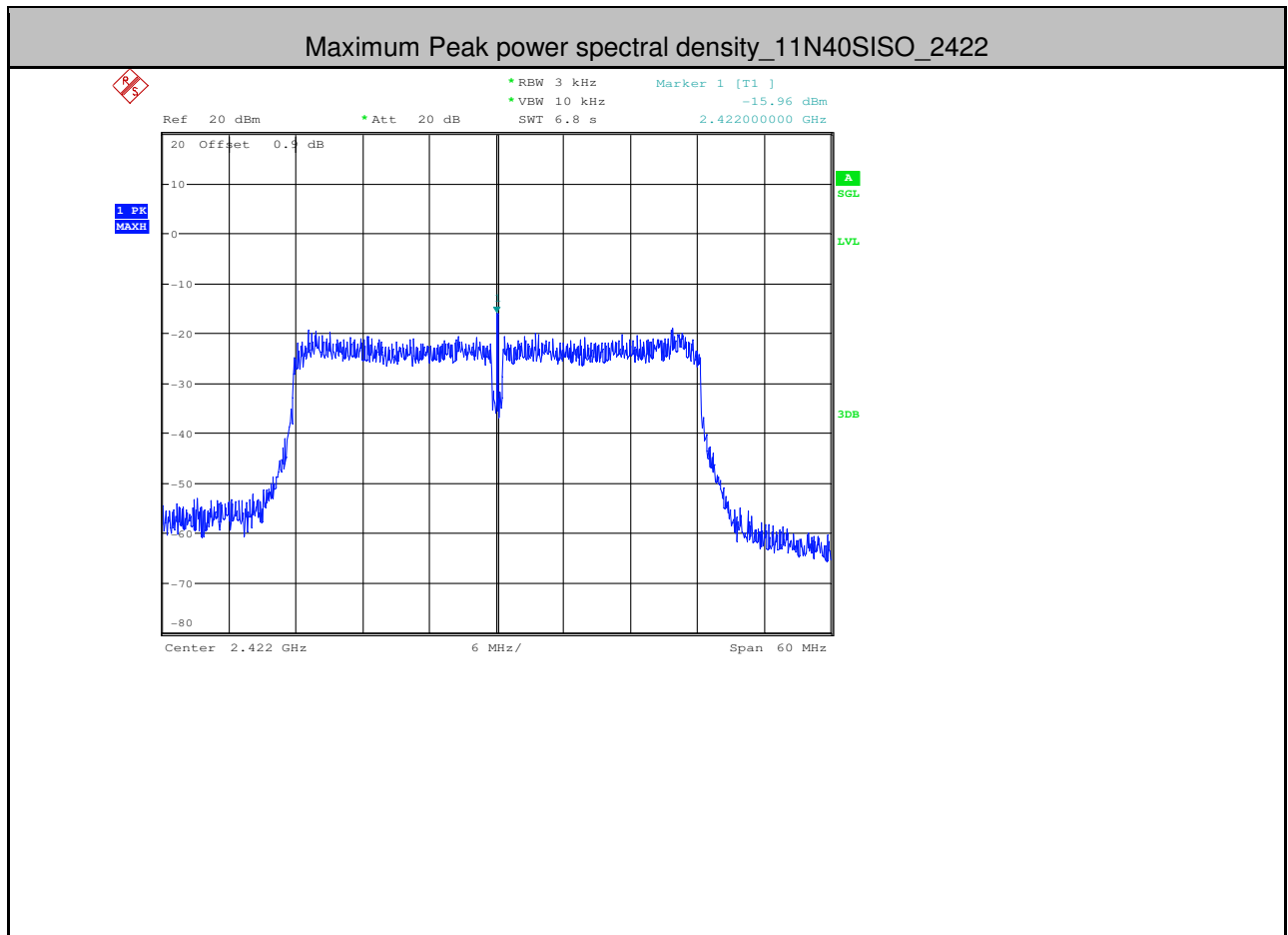




Maximum Peak power spectral density_11N20SISO_2437

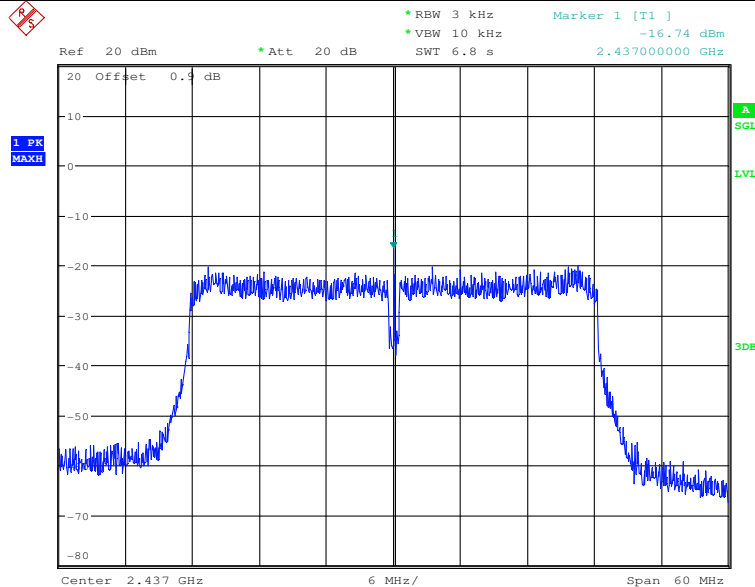








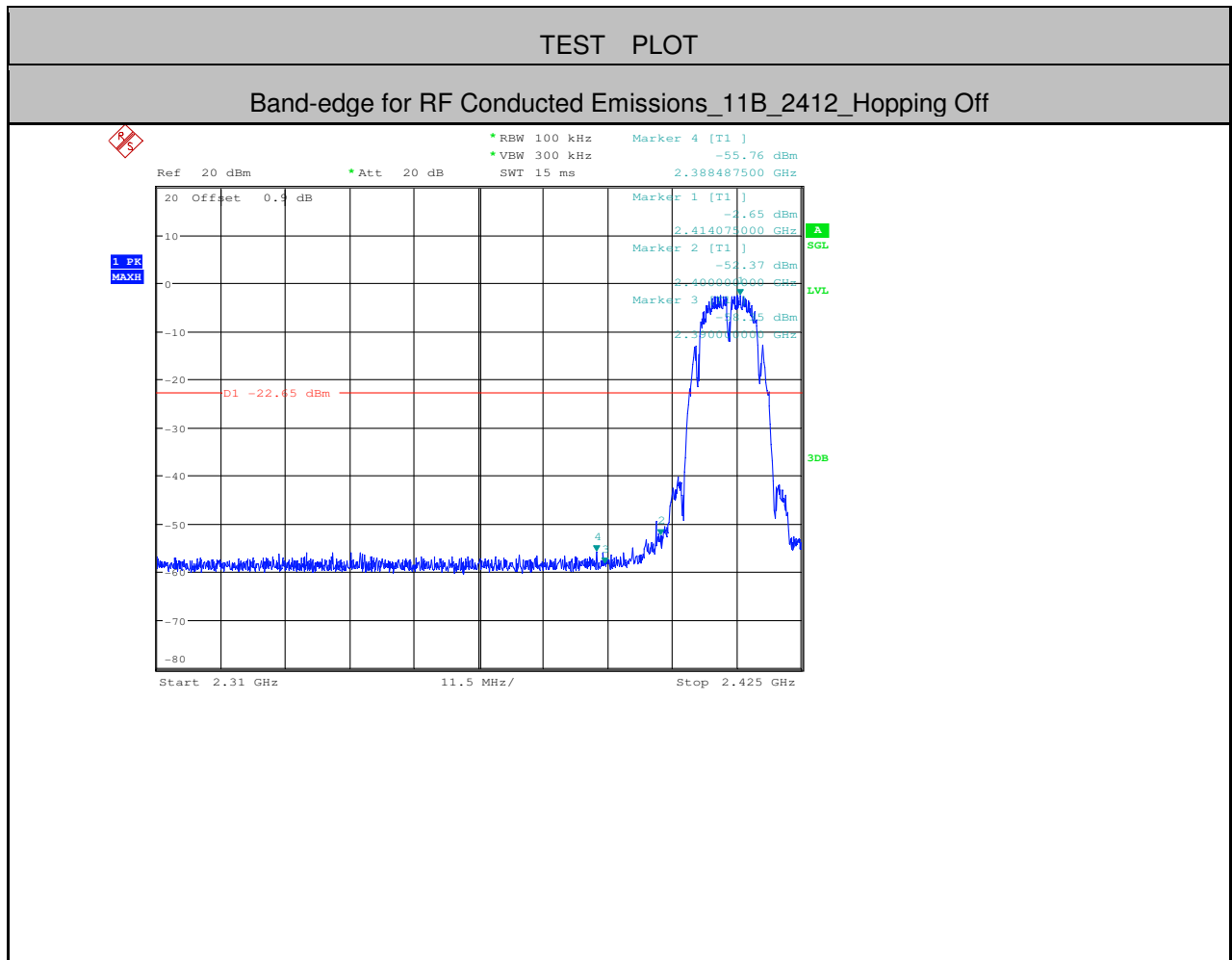
Maximum Peak power spectral density_11N40SISO_2437

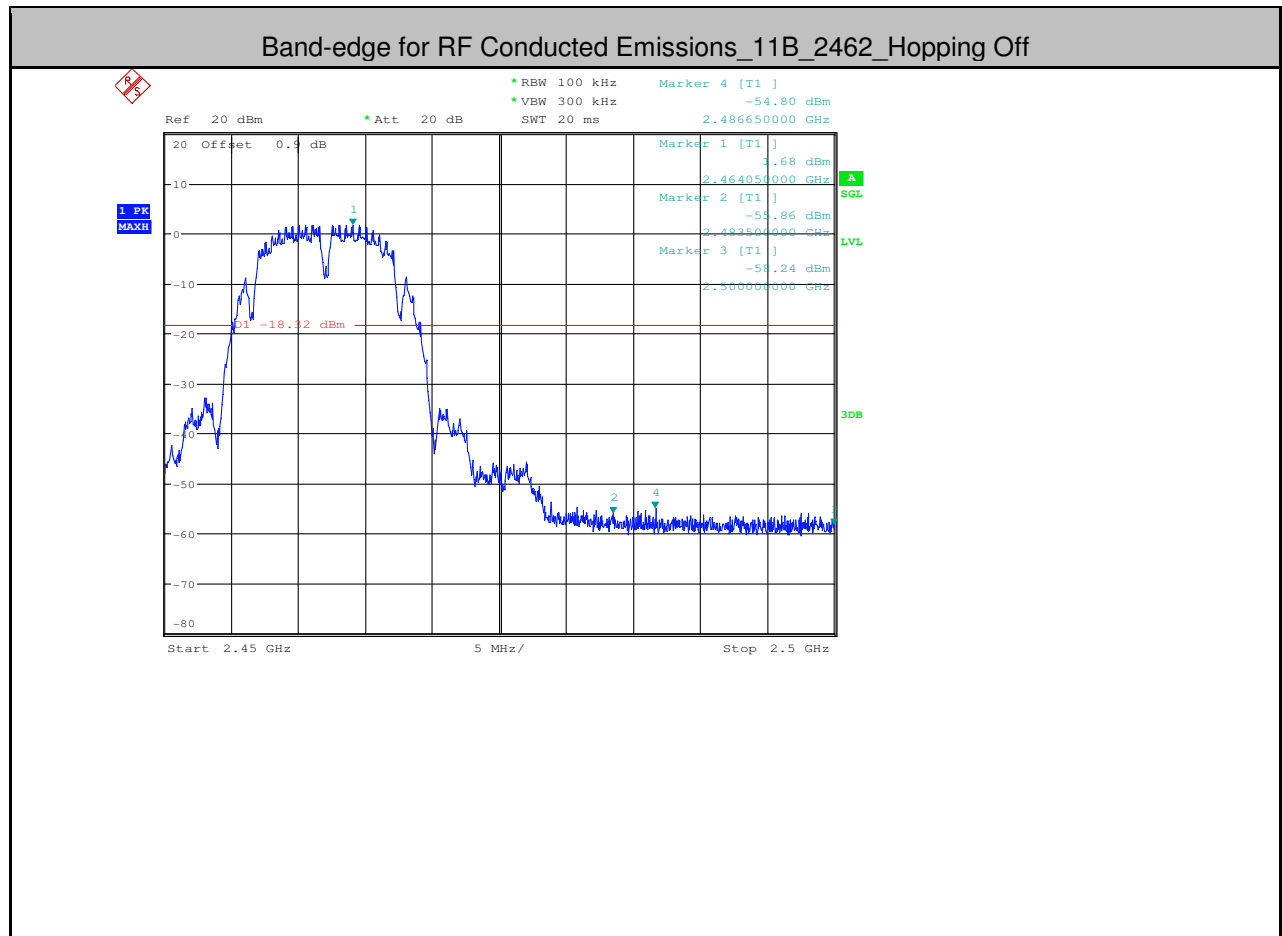




5.Band-edge for RF Conducted Emissions

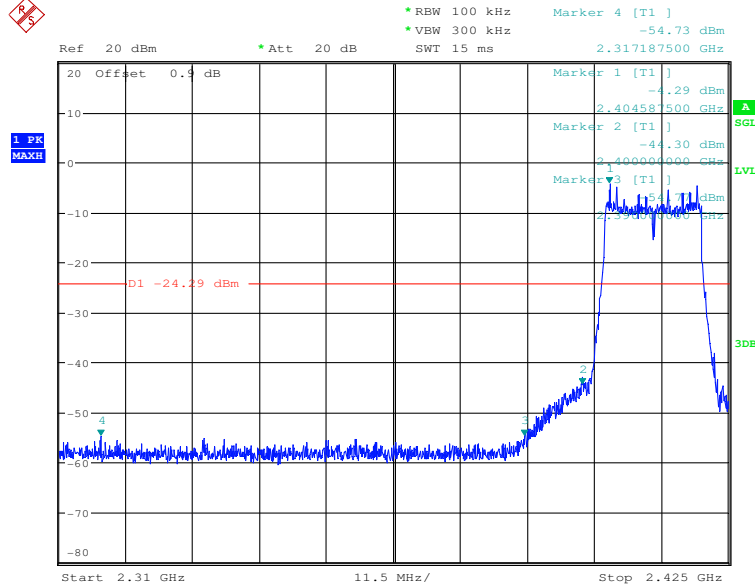
Test Mode	Test Channel	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	2412	-2.650	-55.761	<-22.65	PASS
11B	2462	1.680	-54.798	<-18.32	PASS
11G	2412	-4.290	-54.728	<-24.29	PASS
11G	2462	0.370	-42.772	<-19.63	PASS
11N20SISO	2412	-4.000	-52.016	<-24	PASS
11N20SISO	2462	0.510	-44.063	<-19.49	PASS
11N40SISO	2422	-3.350	-37.293	<-23.35	PASS
11N40SISO	2452	-6.950	-50.447	<-26.95	PASS

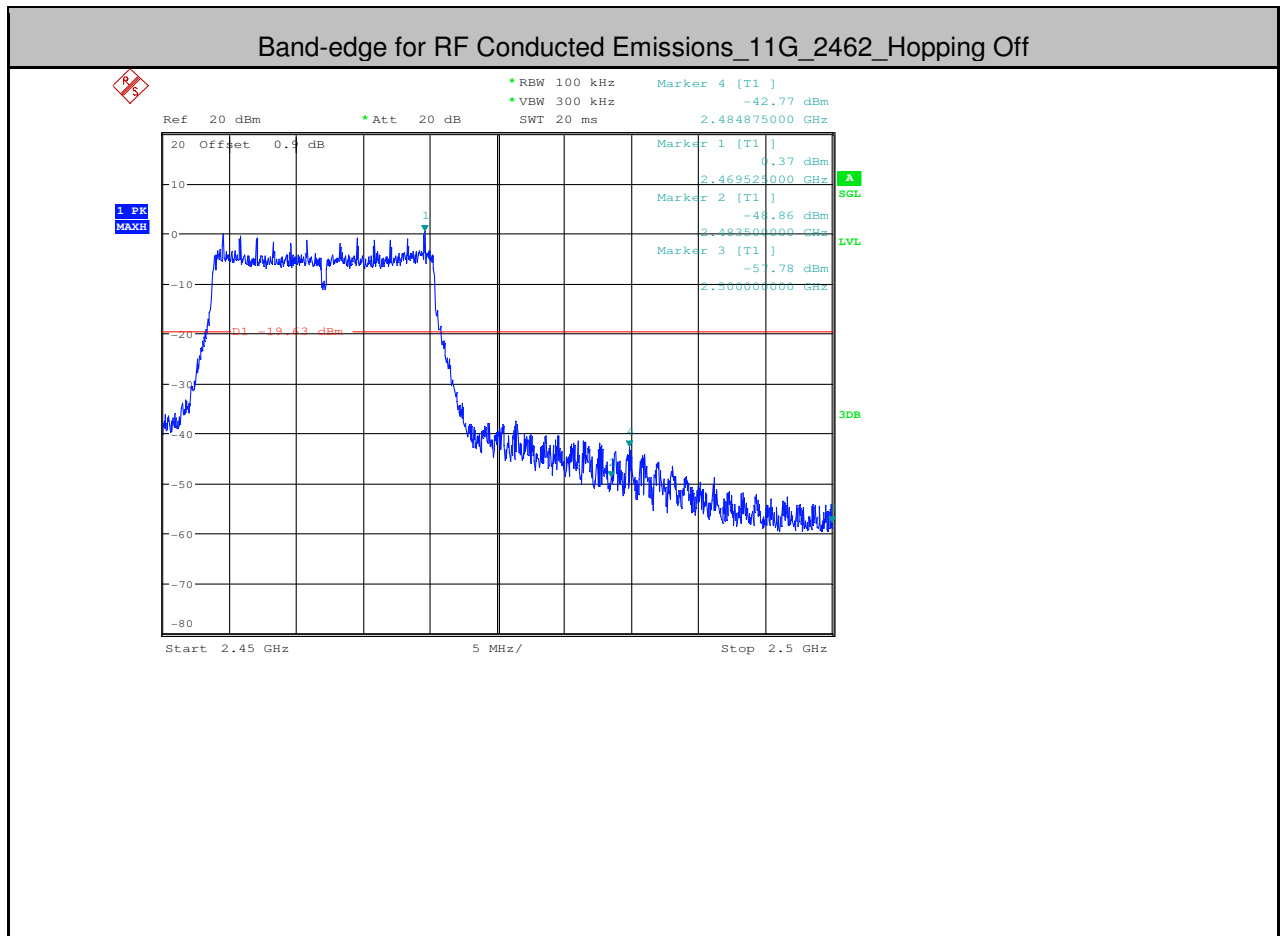


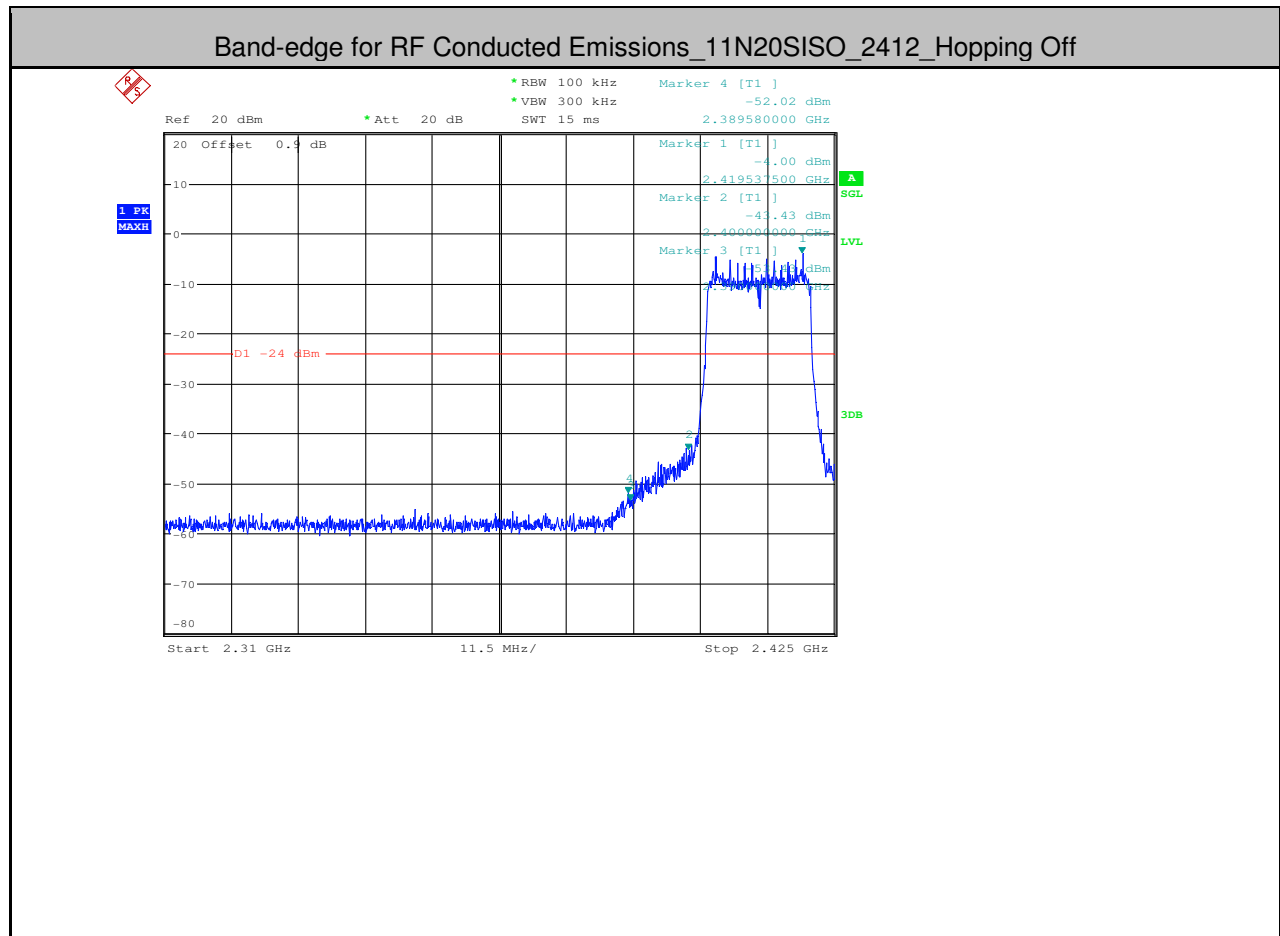




Band-edge for RF Conducted Emissions_11G_2412_Hopping Off

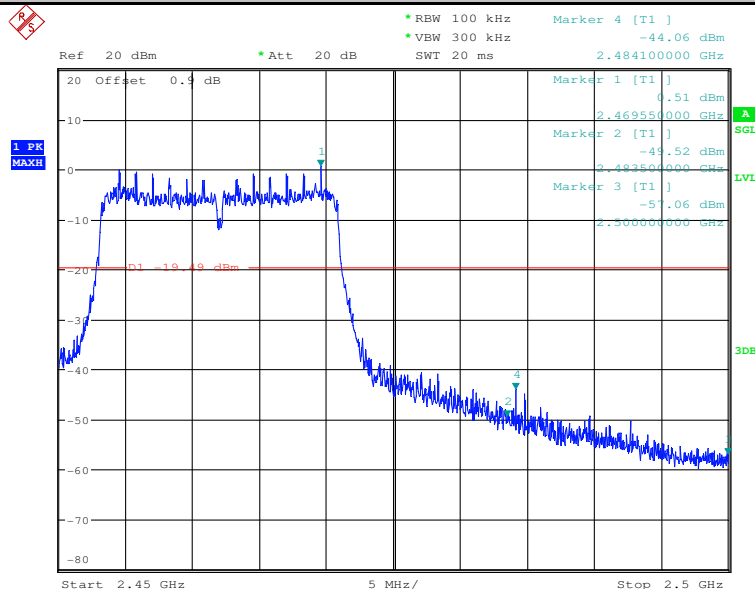






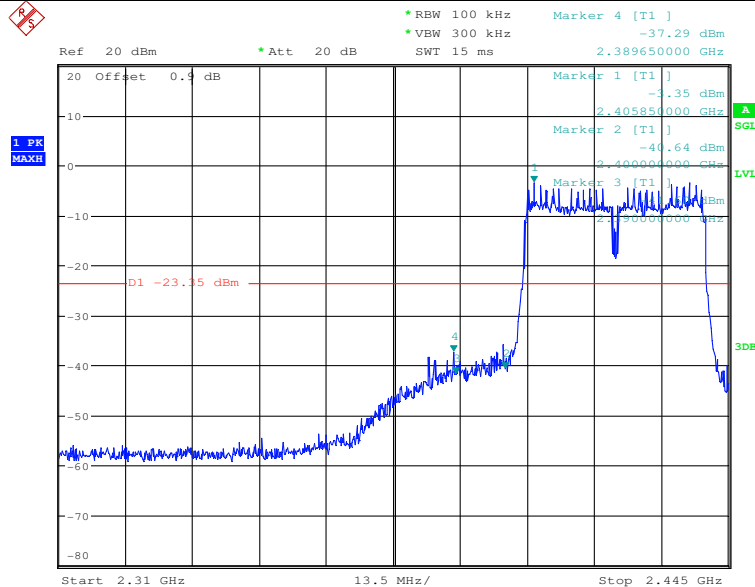


Band-edge for RF Conducted Emissions_11N20SISO_2462_Hopping Off



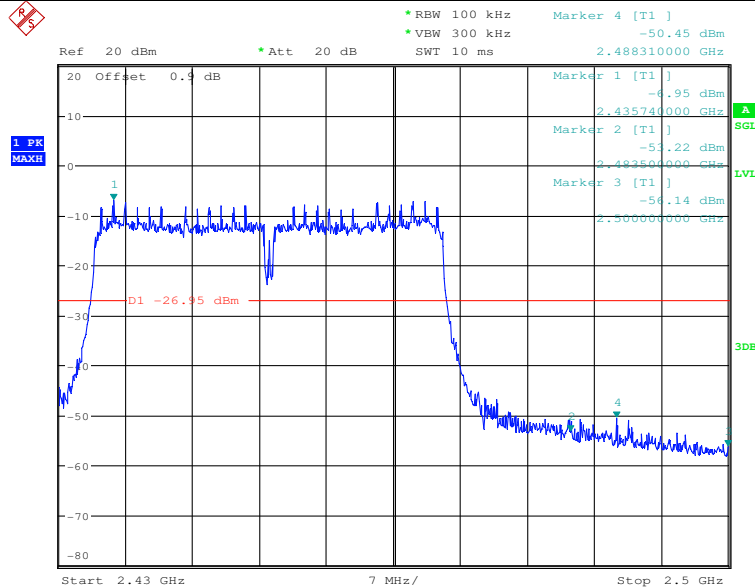


Band-edge for RF Conducted Emissions_11N40SISO_2422_Hopping Off





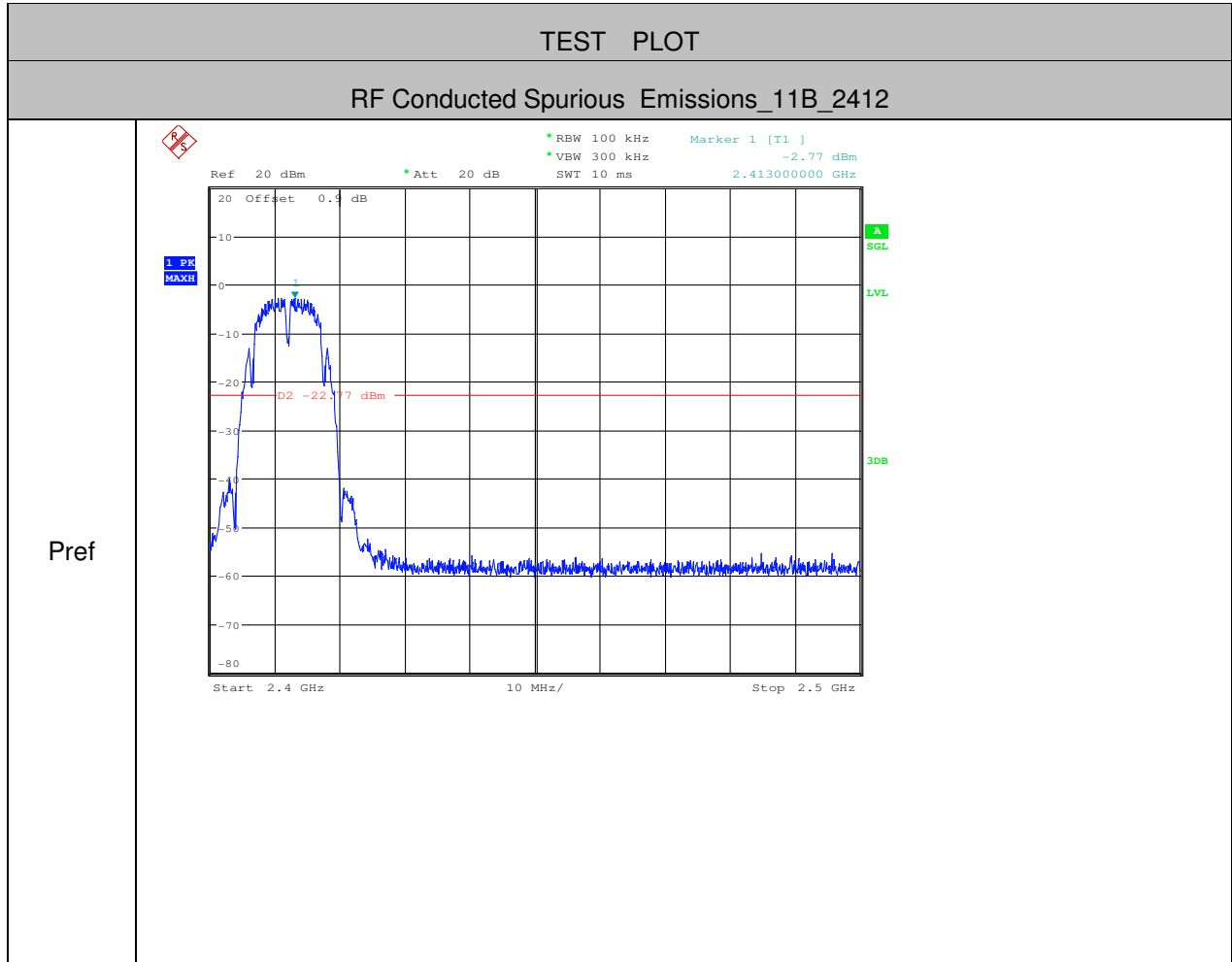
Band-edge for RF Conducted Emissions_11N40SISO_2452_Hopping Off

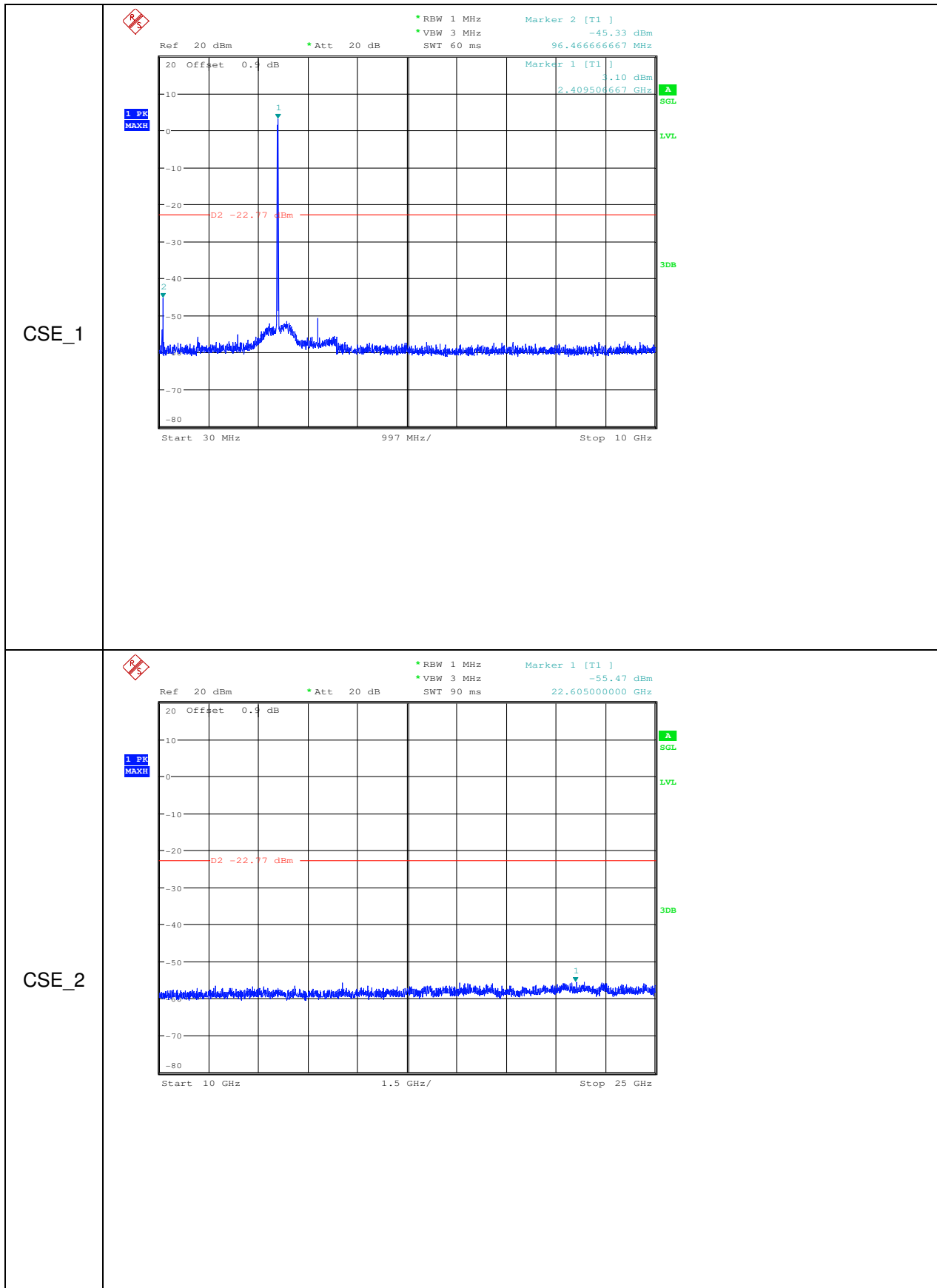


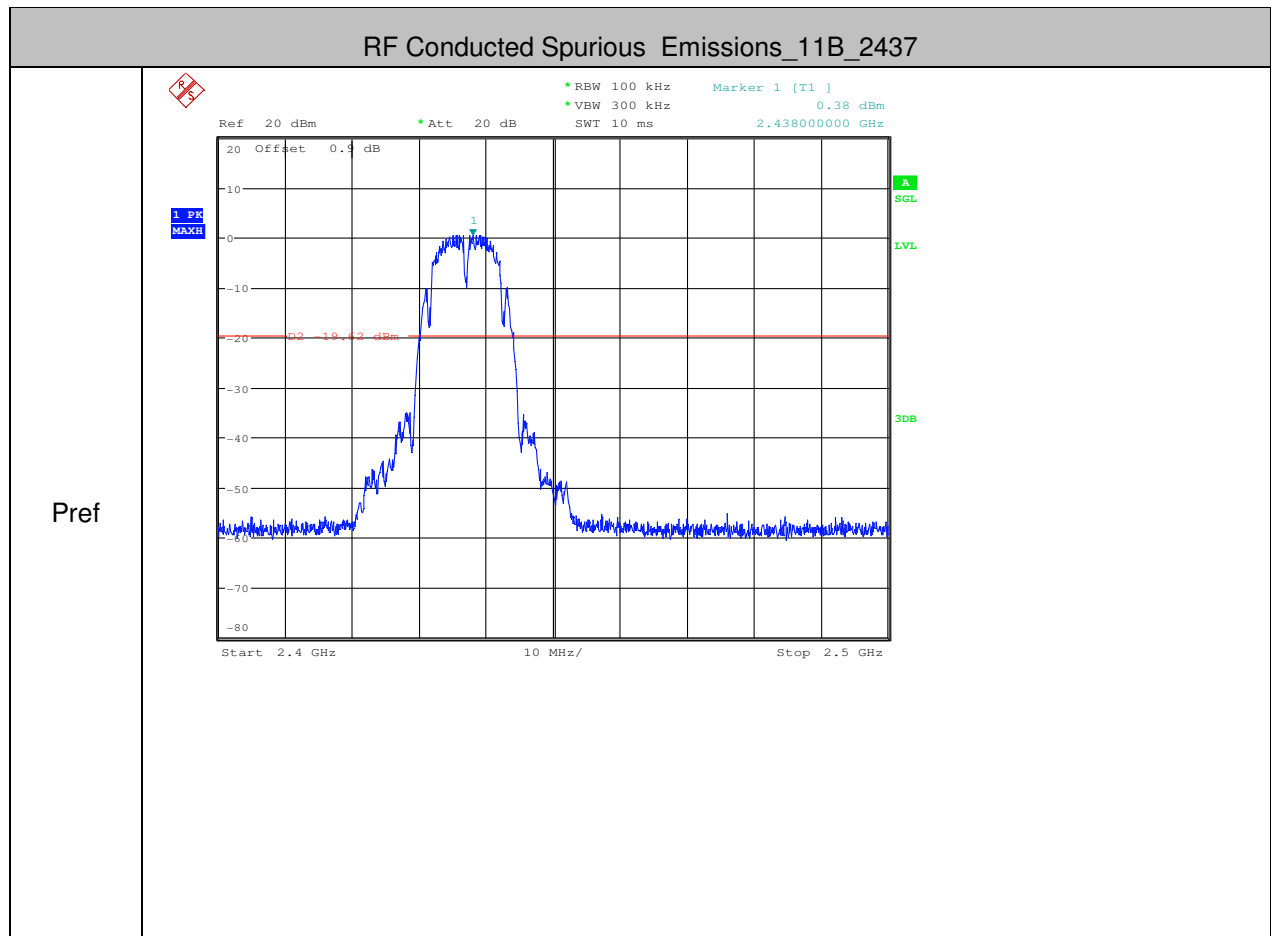


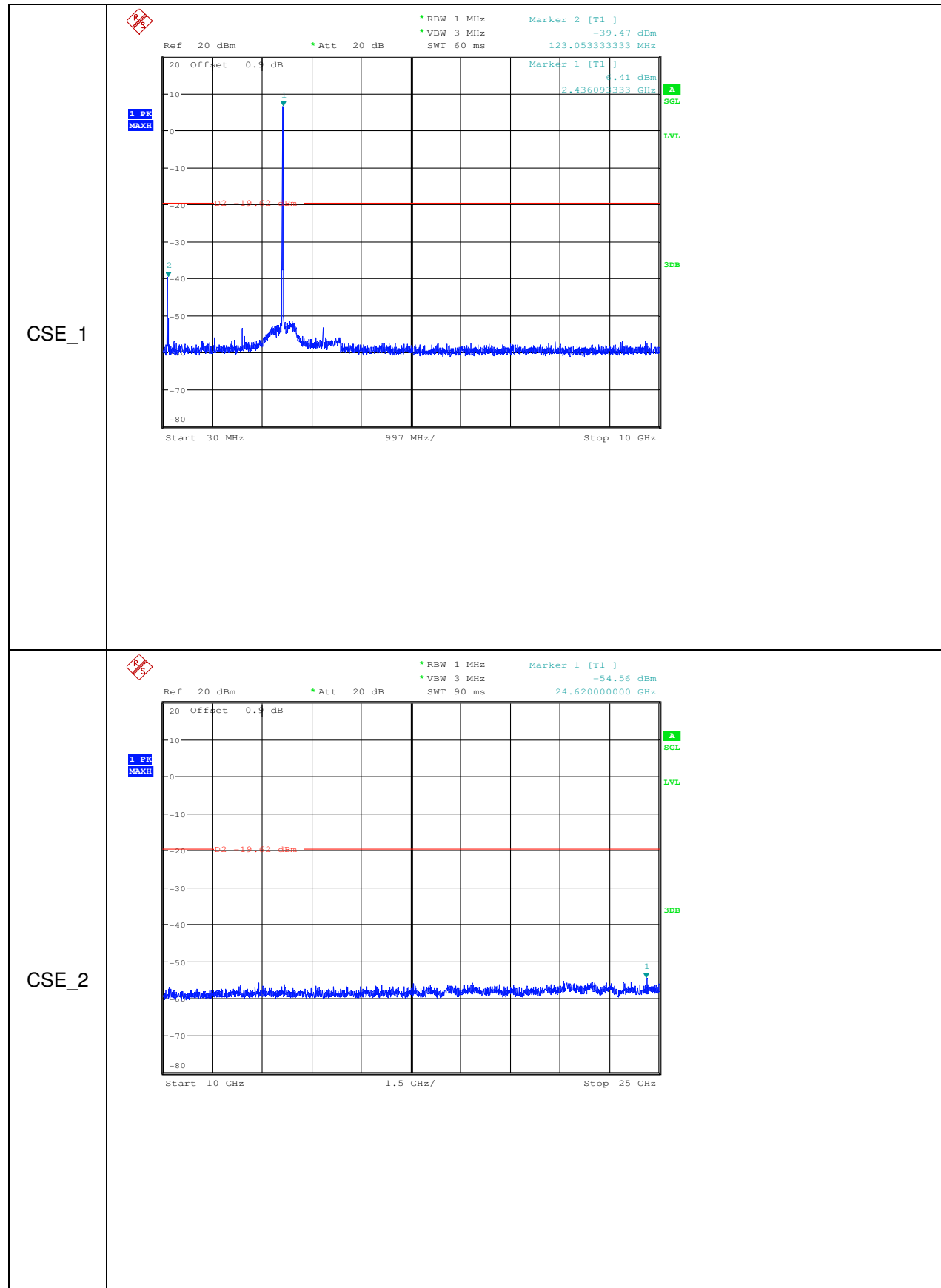
6.RF Conducted Spurious Emissions

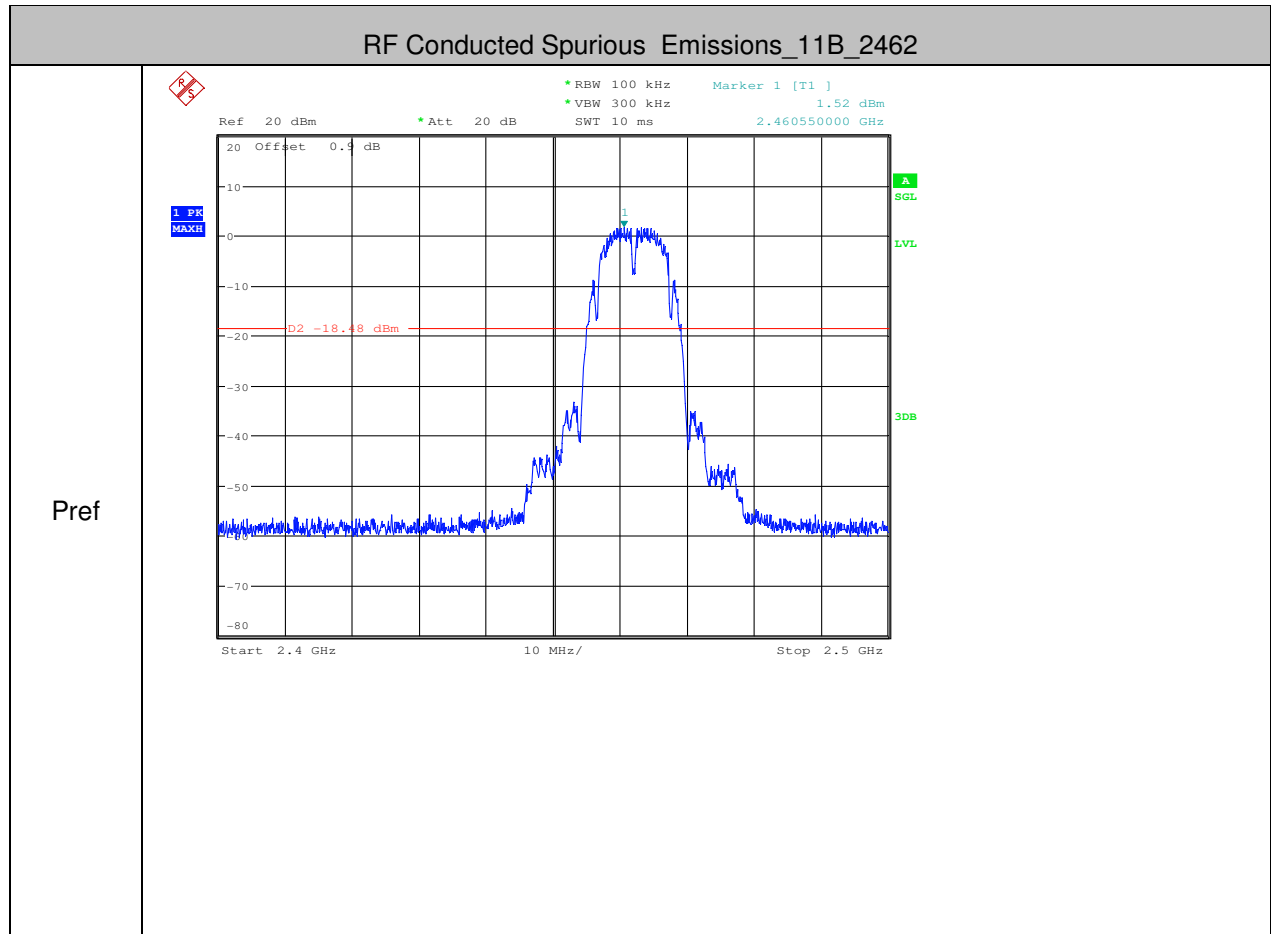
Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	2412	30	10000	1000	3000	-2.77	-45.330	<-22.77	PASS
11B	2412	10000	25000	1000	3000	-2.77	-55.470	<-22.77	PASS
11B	2437	30	10000	1000	3000	0.38	-39.470	<-19.62	PASS
11B	2437	10000	25000	1000	3000	0.38	-54.560	<-19.62	PASS
11B	2462	30	10000	1000	3000	1.52	-37.560	<-18.48	PASS
11B	2462	10000	25000	1000	3000	1.52	-55.330	<-18.48	PASS
11G	2412	30	10000	1000	3000	-4.99	-46.960	<-24.99	PASS
11G	2412	10000	25000	1000	3000	-4.99	-55.240	<-24.99	PASS
11G	2437	30	10000	1000	3000	-0.98	-41.550	<-20.98	PASS
11G	2437	10000	25000	1000	3000	-0.98	-54.780	<-20.98	PASS
11G	2462	30	10000	1000	3000	-0.15	-38.880	<-20.15	PASS
11G	2462	10000	25000	1000	3000	-0.15	-55.040	<-20.15	PASS
11N20SISO	2412	30	10000	1000	3000	-4.58	-44.050	<-24.58	PASS
11N20SISO	2412	10000	25000	1000	3000	-4.58	-54.790	<-24.58	PASS
11N20SISO	2437	30	10000	1000	3000	-1.11	-38.490	<-21.11	PASS
11N20SISO	2437	10000	25000	1000	3000	-1.11	-54.880	<-21.11	PASS
11N20SISO	2462	30	10000	1000	3000	0.12	-35.800	<-19.88	PASS
11N20SISO	2462	10000	25000	1000	3000	0.12	-54.560	<-19.88	PASS
11N40SISO	2422	30	10000	1000	3000	-3.39	-44.120	<-23.39	PASS
11N40SISO	2422	10000	25000	1000	3000	-3.39	-54.850	<-23.39	PASS
11N40SISO	2437	30	10000	1000	3000	-4.17	-46.030	<-24.17	PASS
11N40SISO	2437	10000	25000	1000	3000	-4.17	-54.440	<-24.17	PASS
11N40SISO	2452	30	10000	1000	3000	-7.03	-50.120	<-27.03	PASS
11N40SISO	2452	10000	25000	1000	3000	-7.03	-54.740	<-27.03	PASS

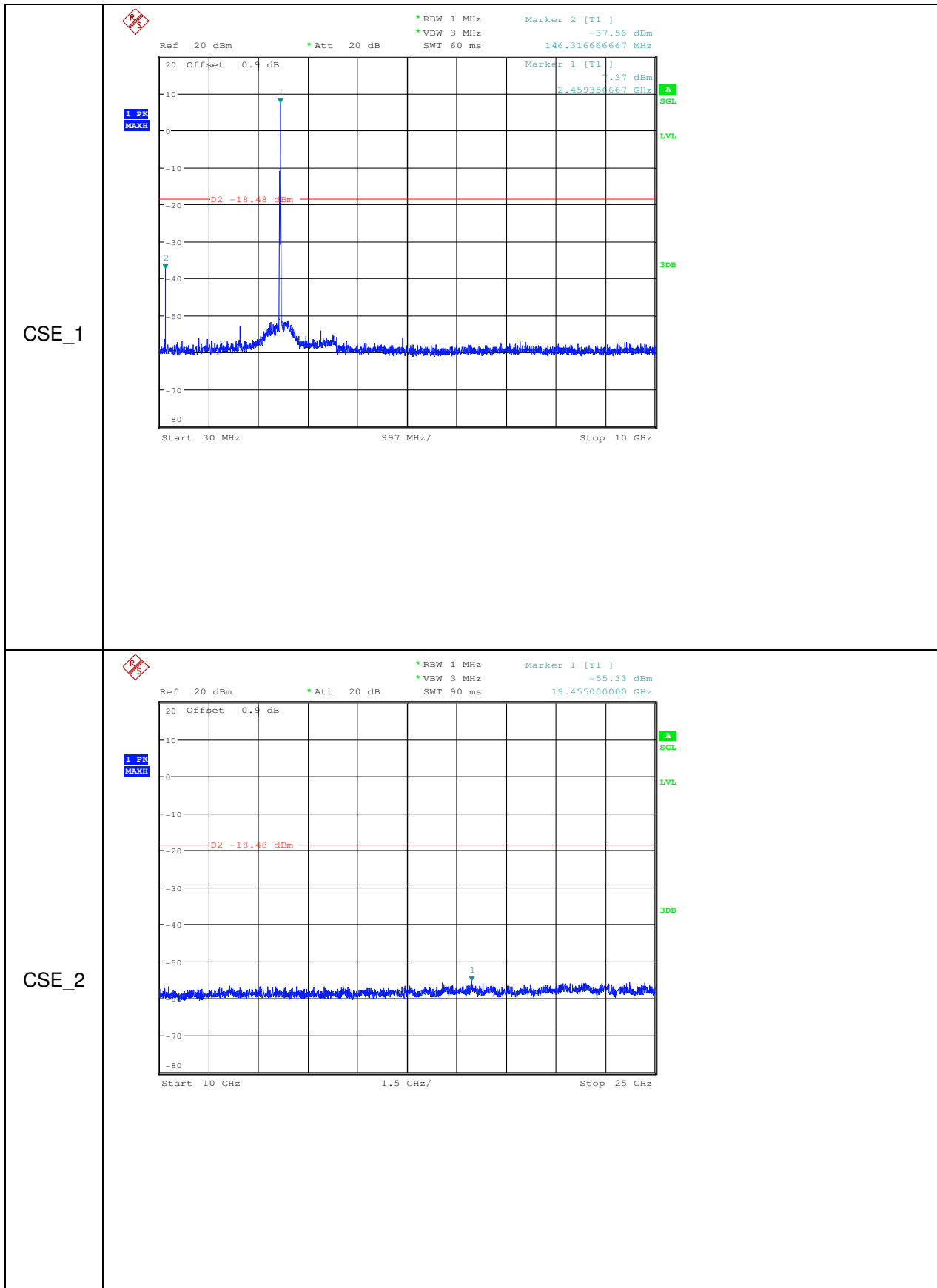








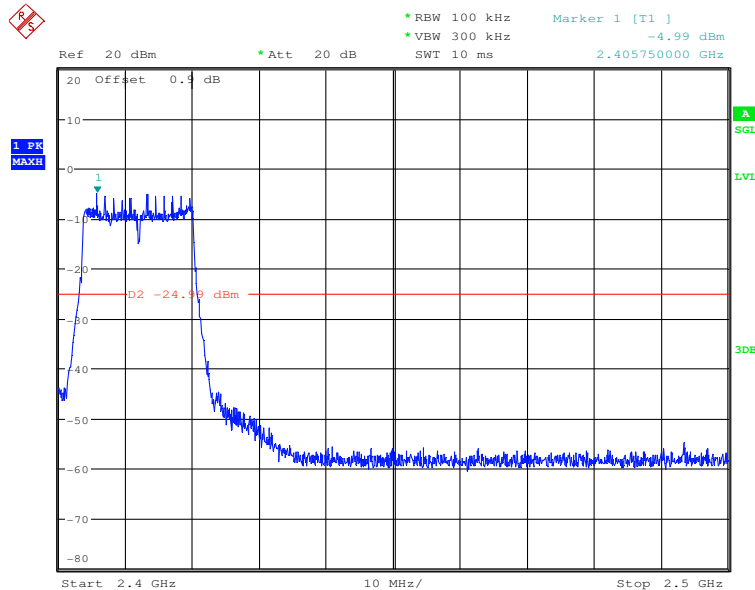


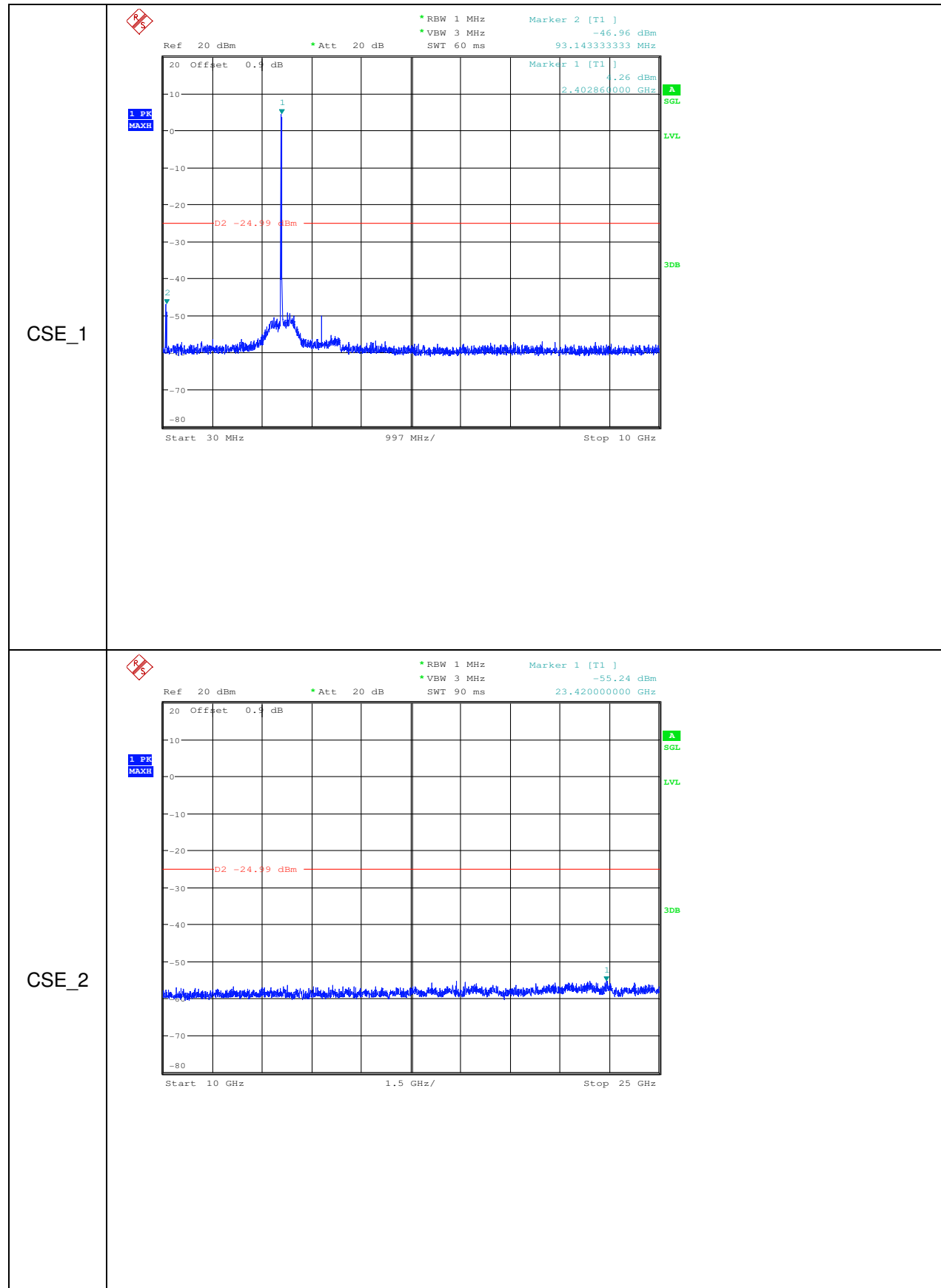




RF Conducted Spurious Emissions_11G_2412

Pref

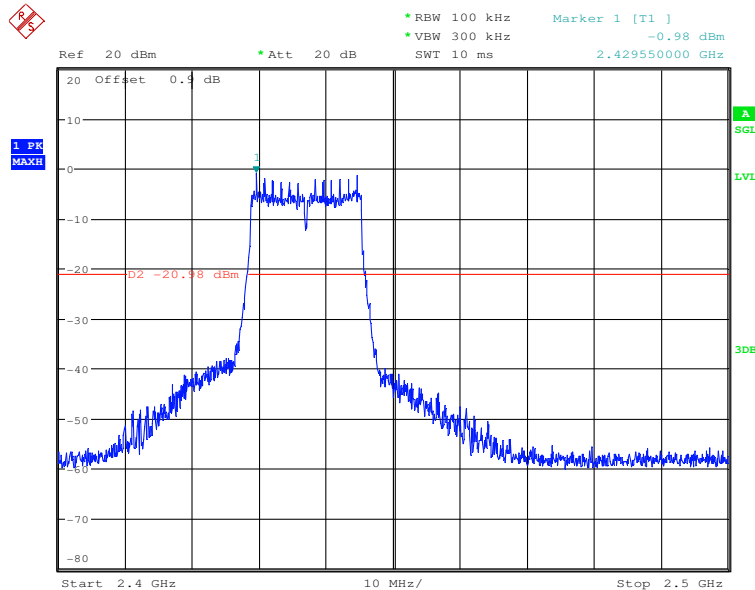


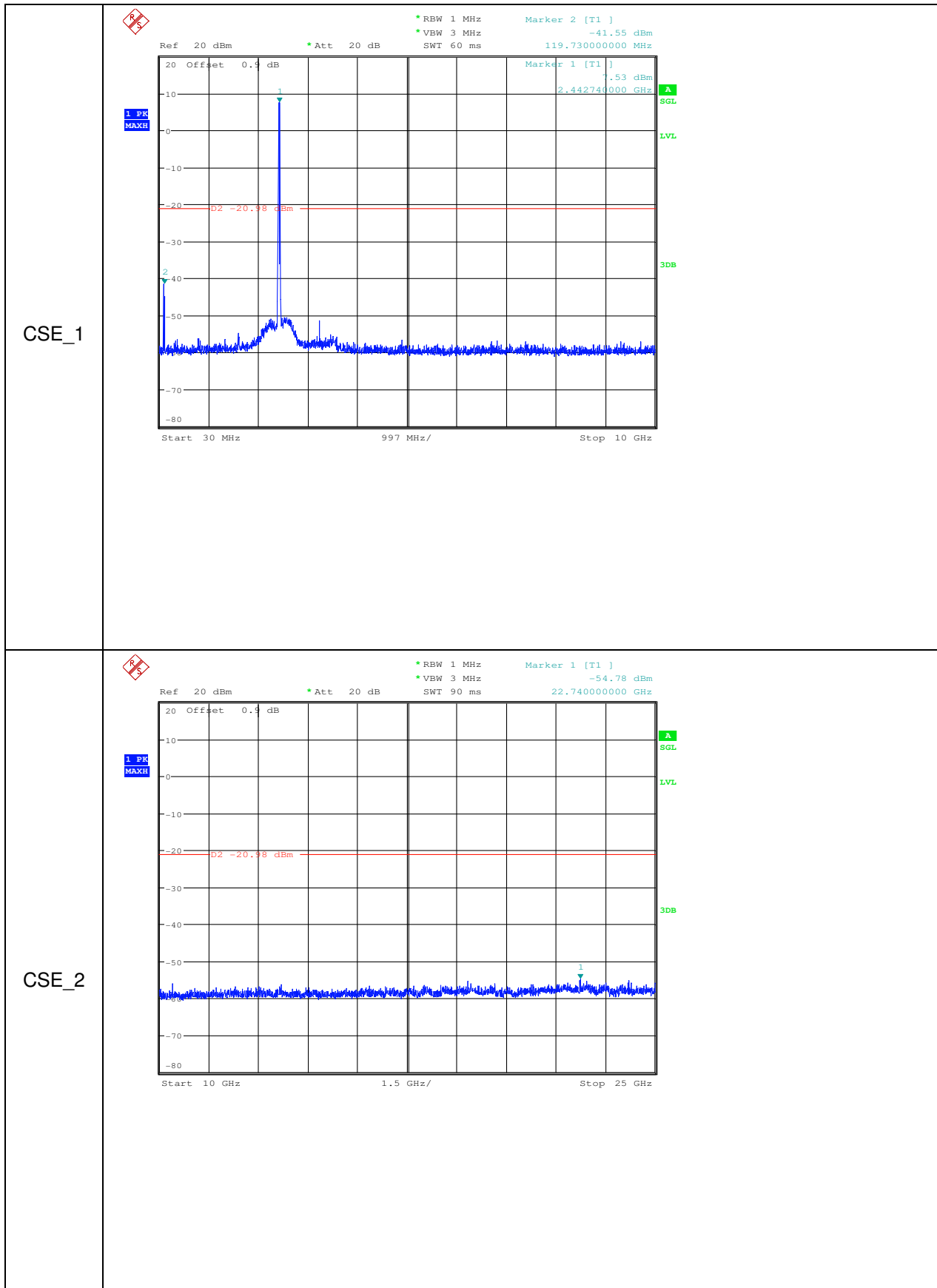


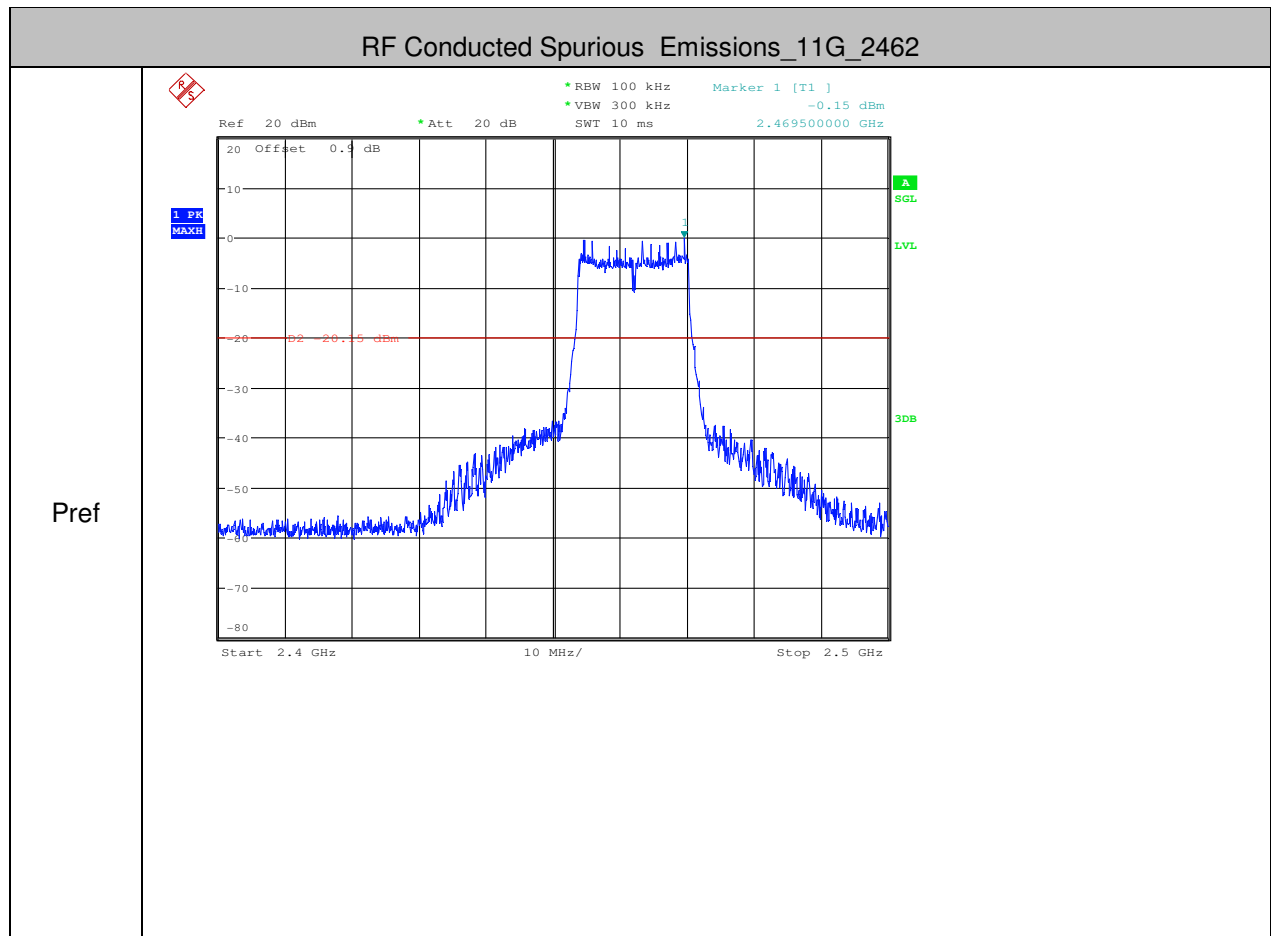


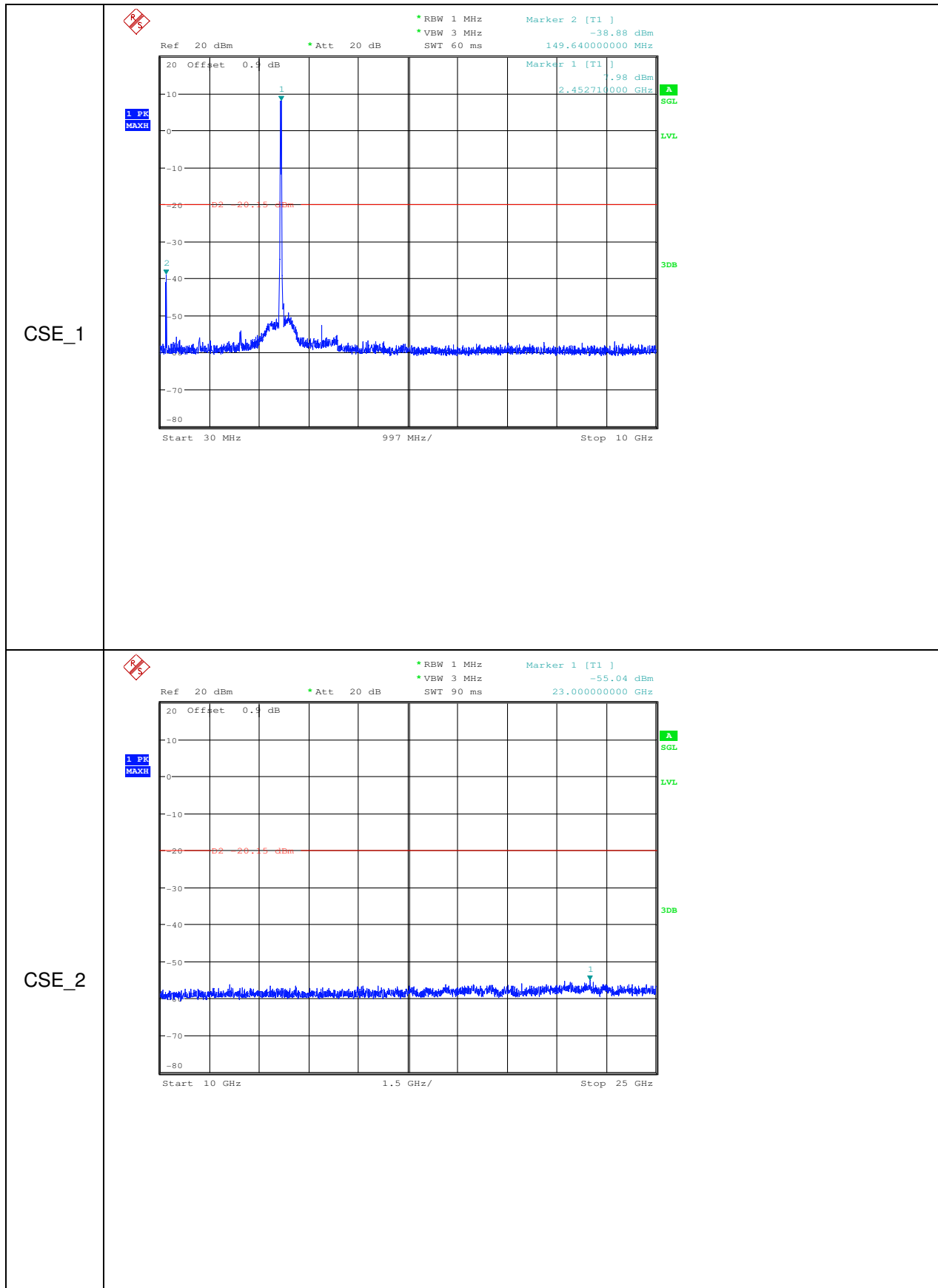
RF Conducted Spurious Emissions_11G_2437

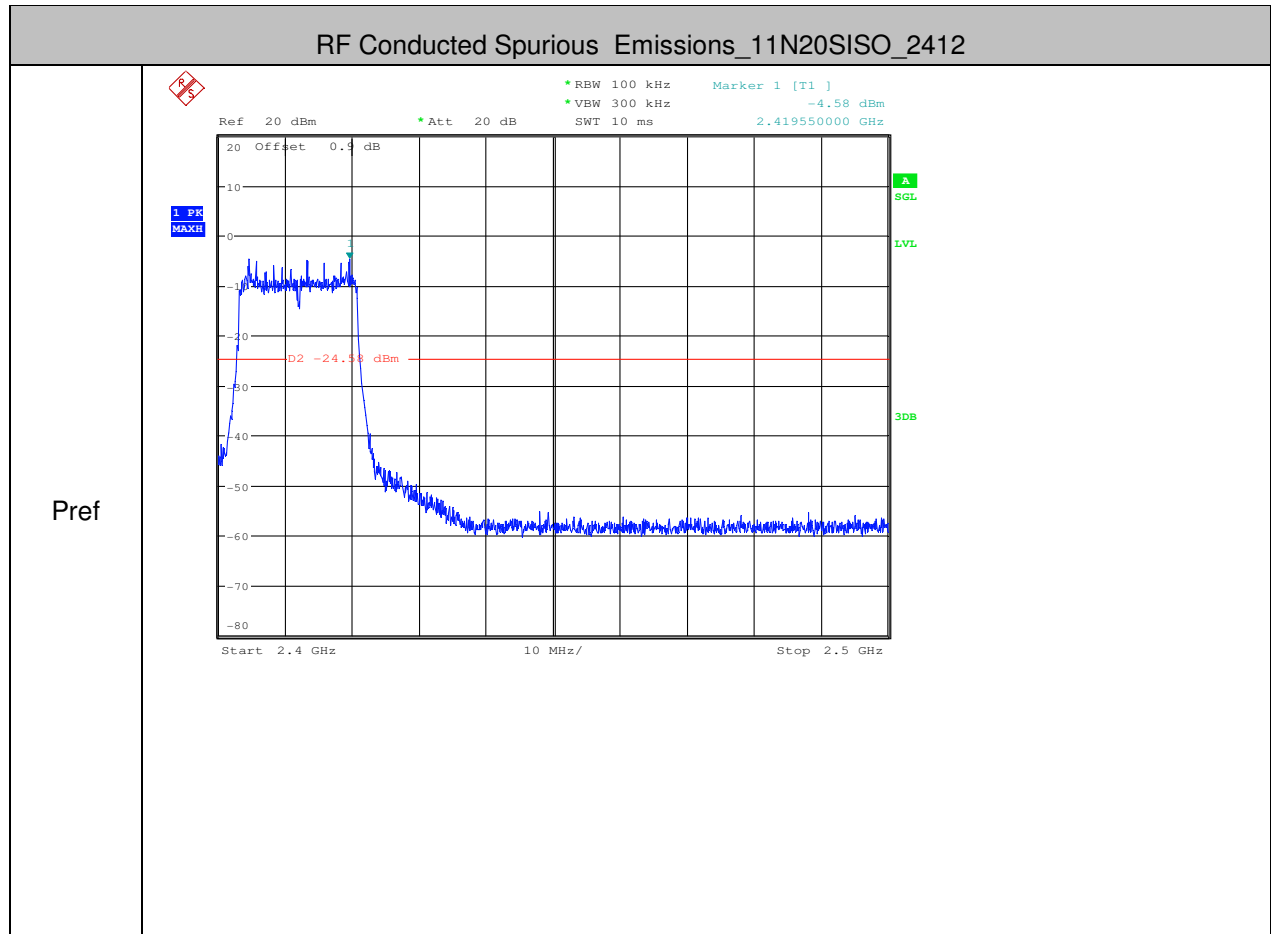
Pref

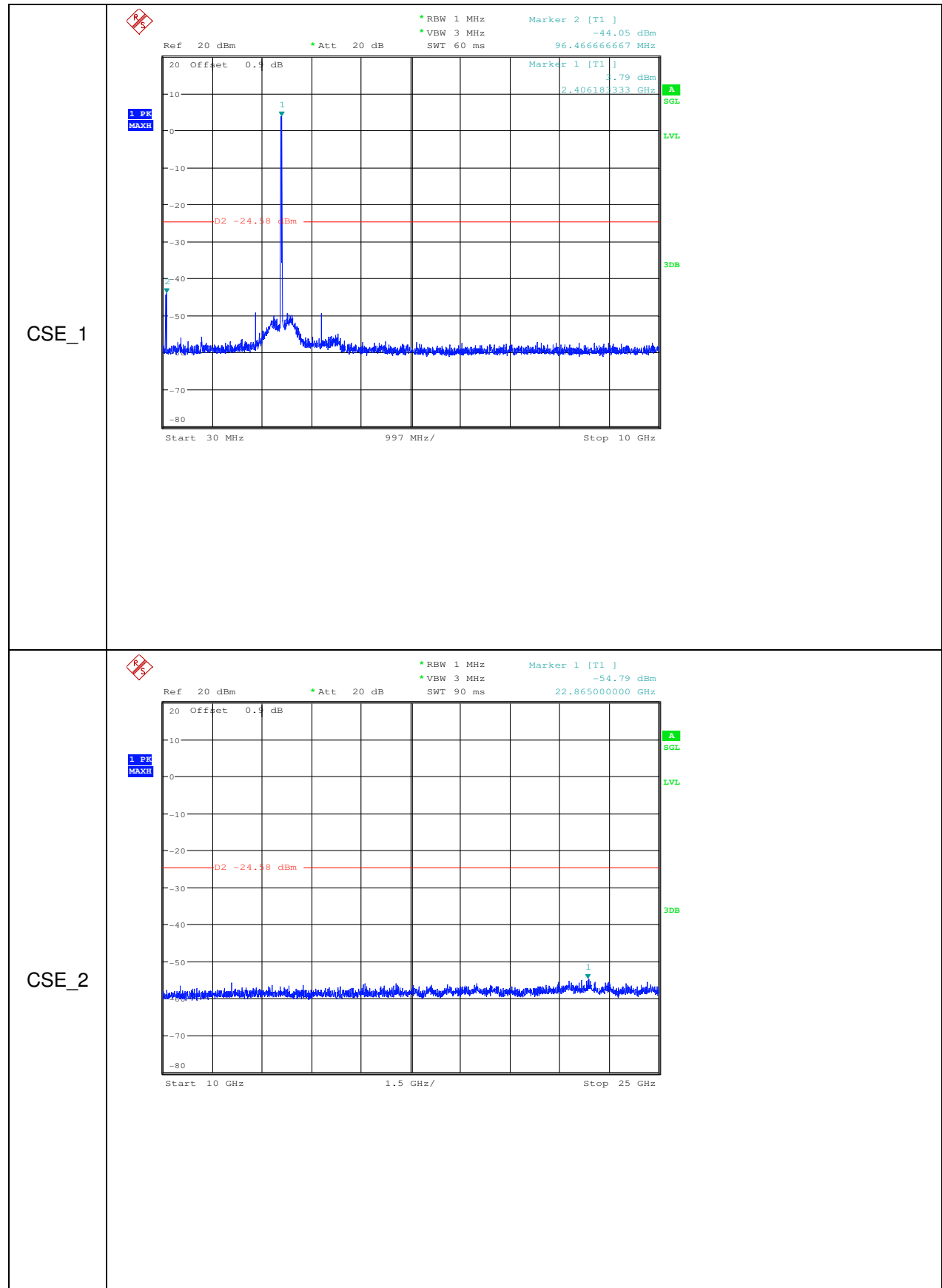


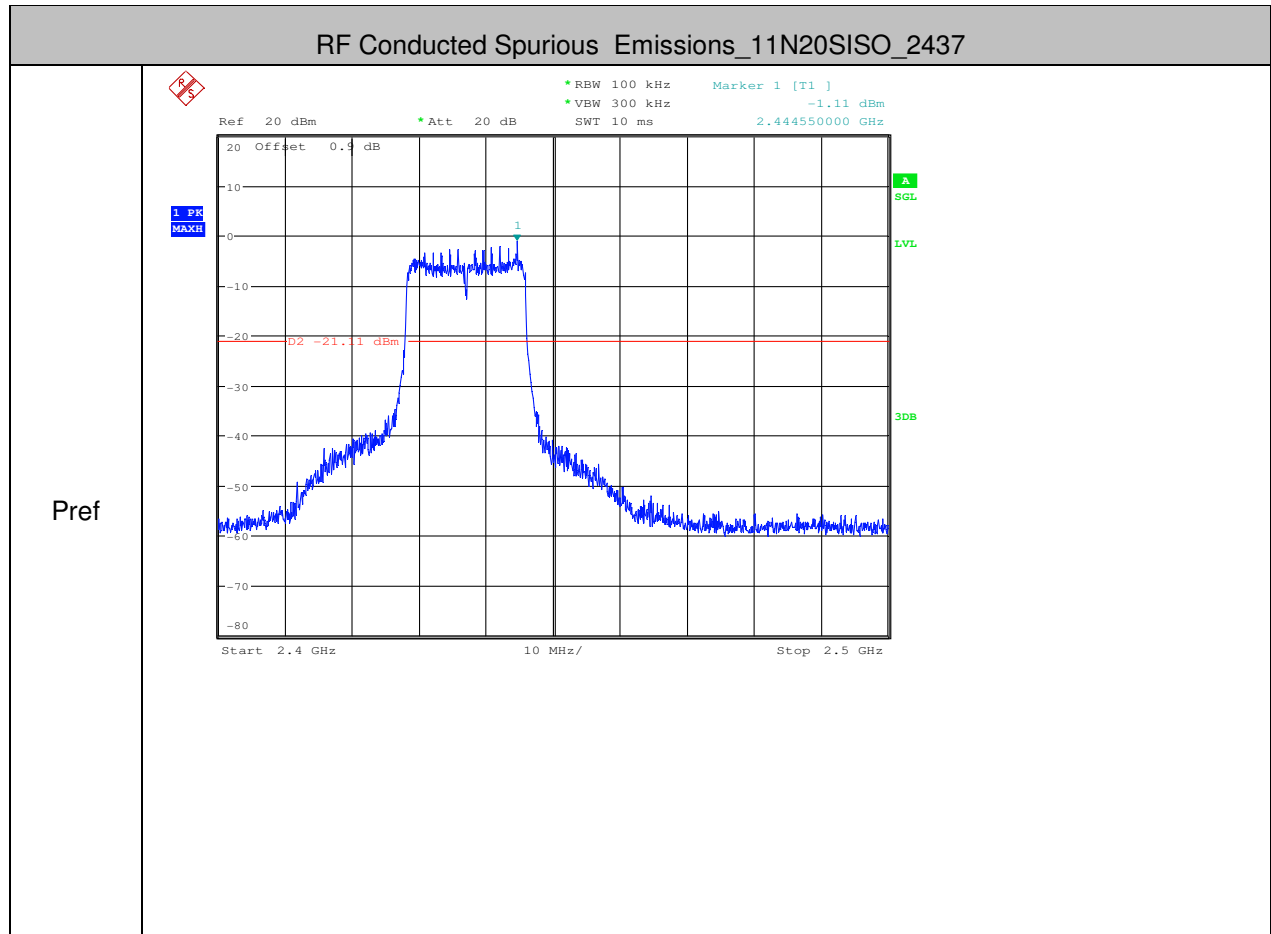


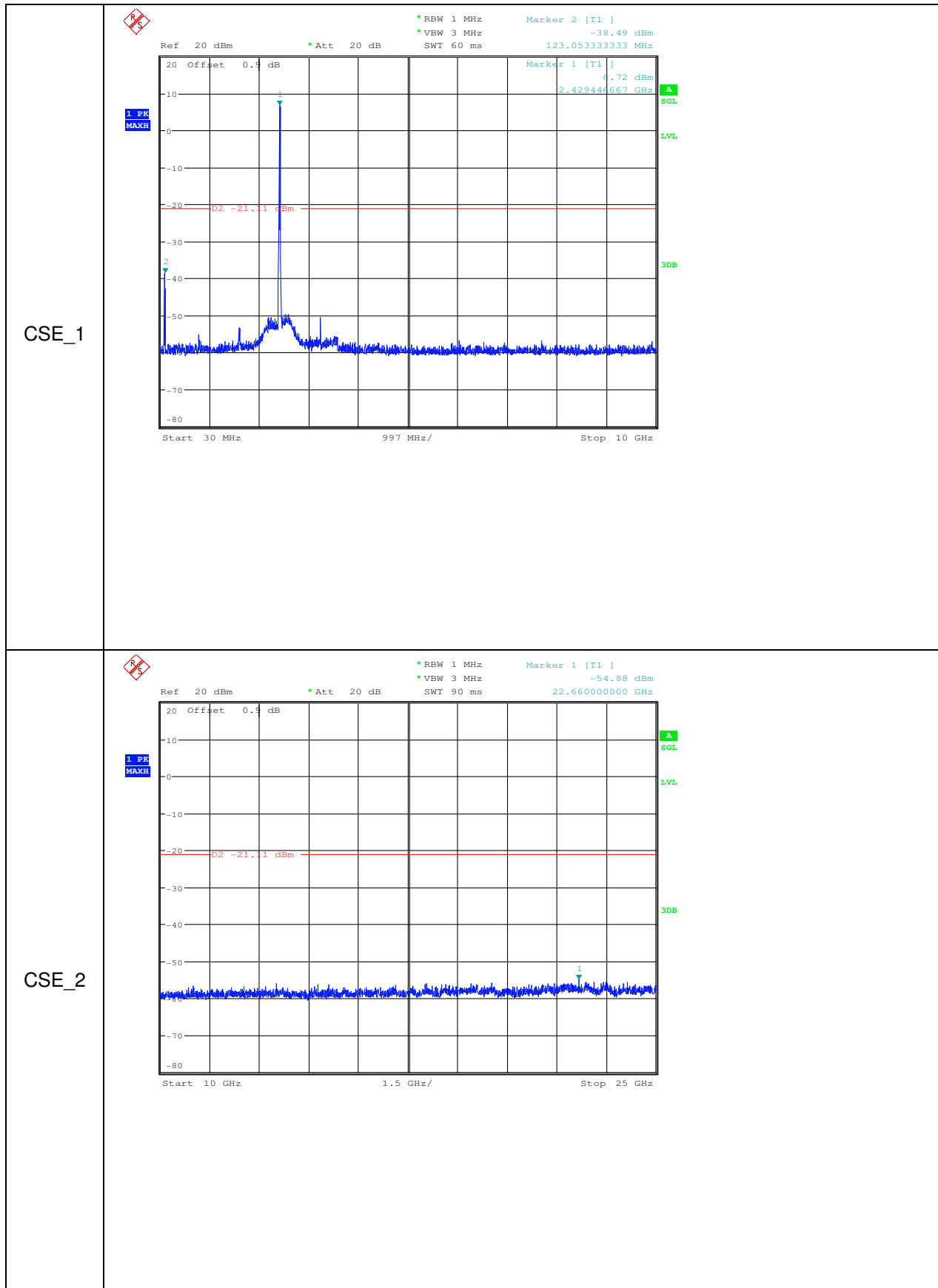


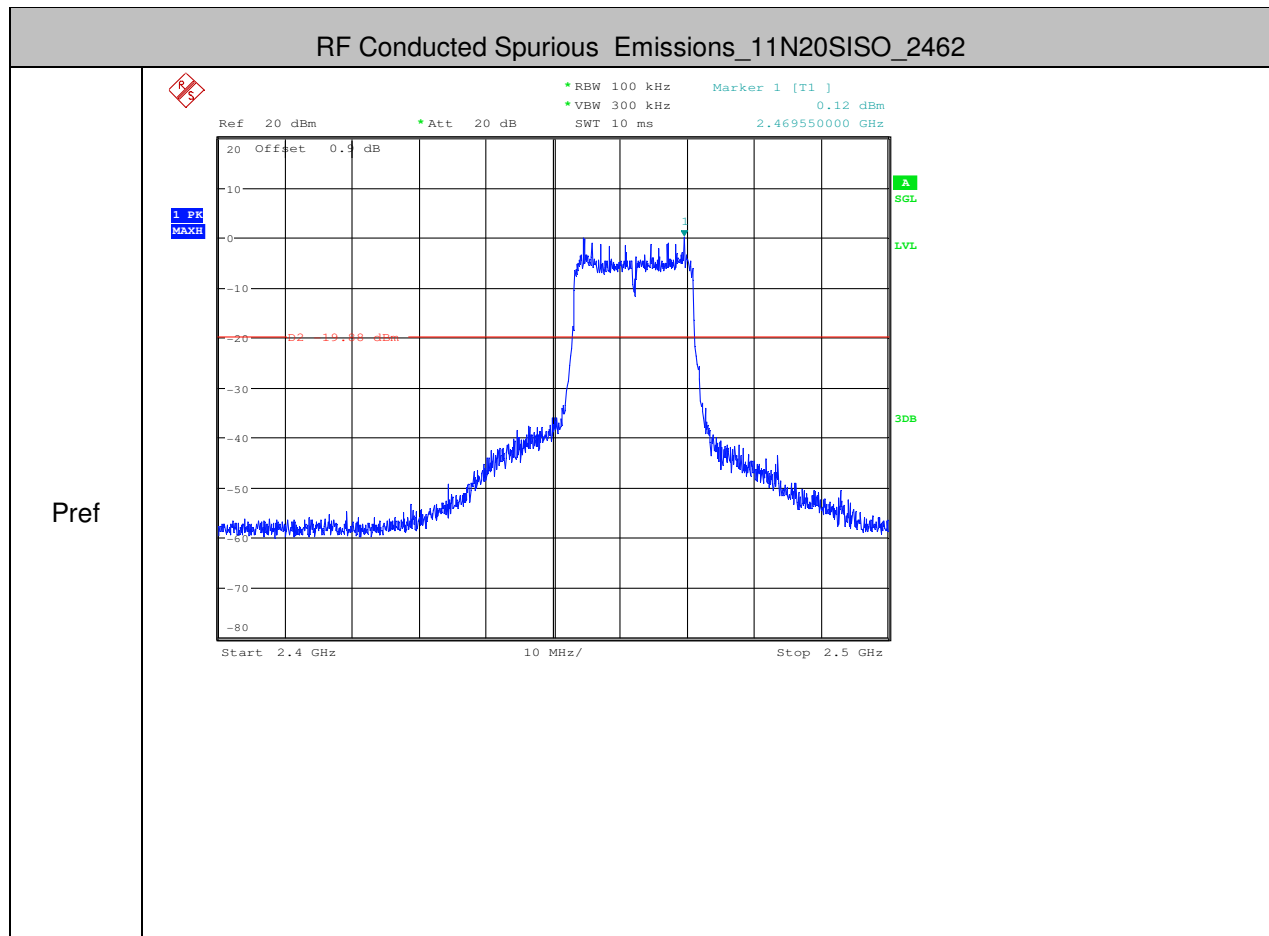


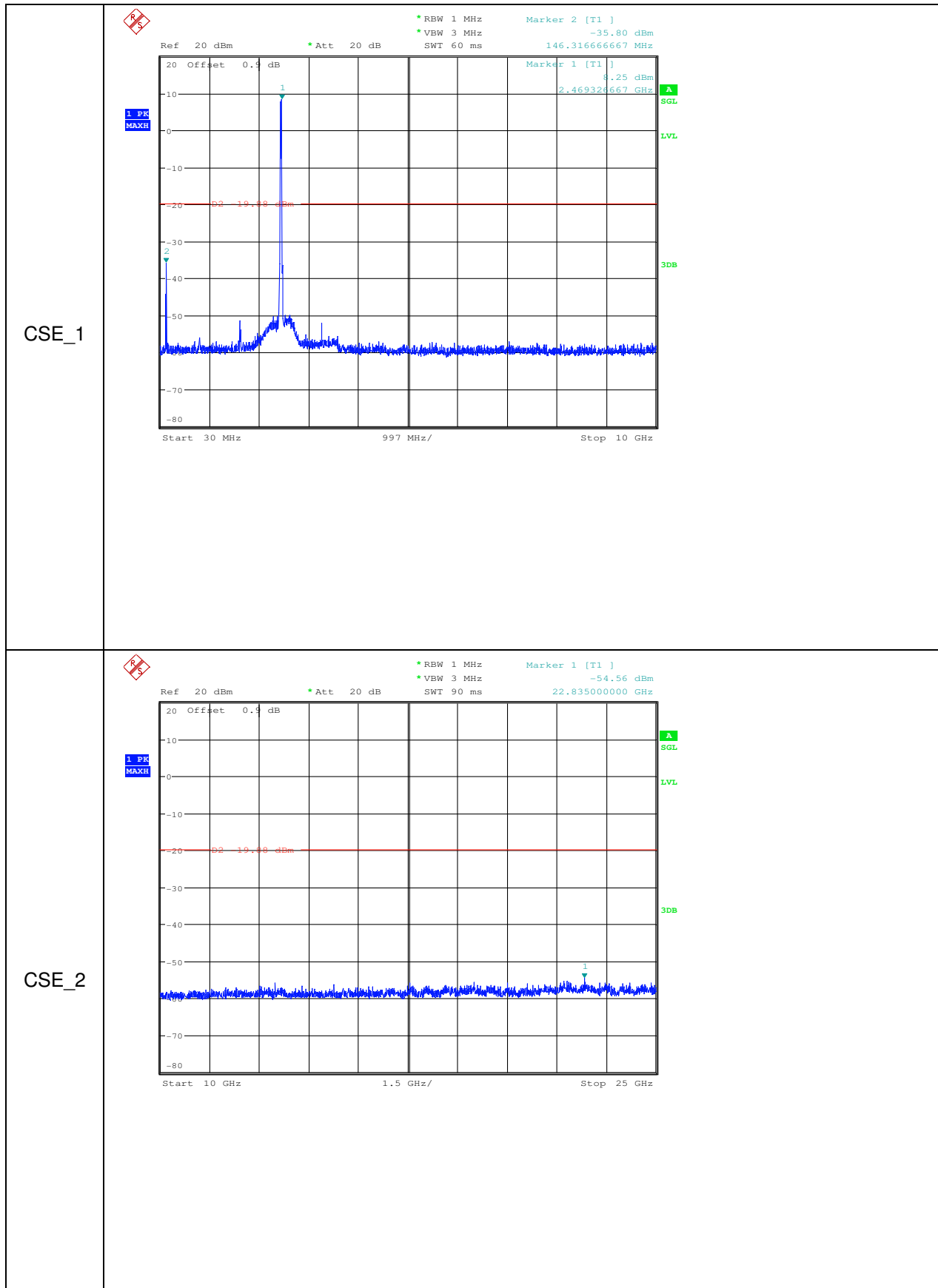


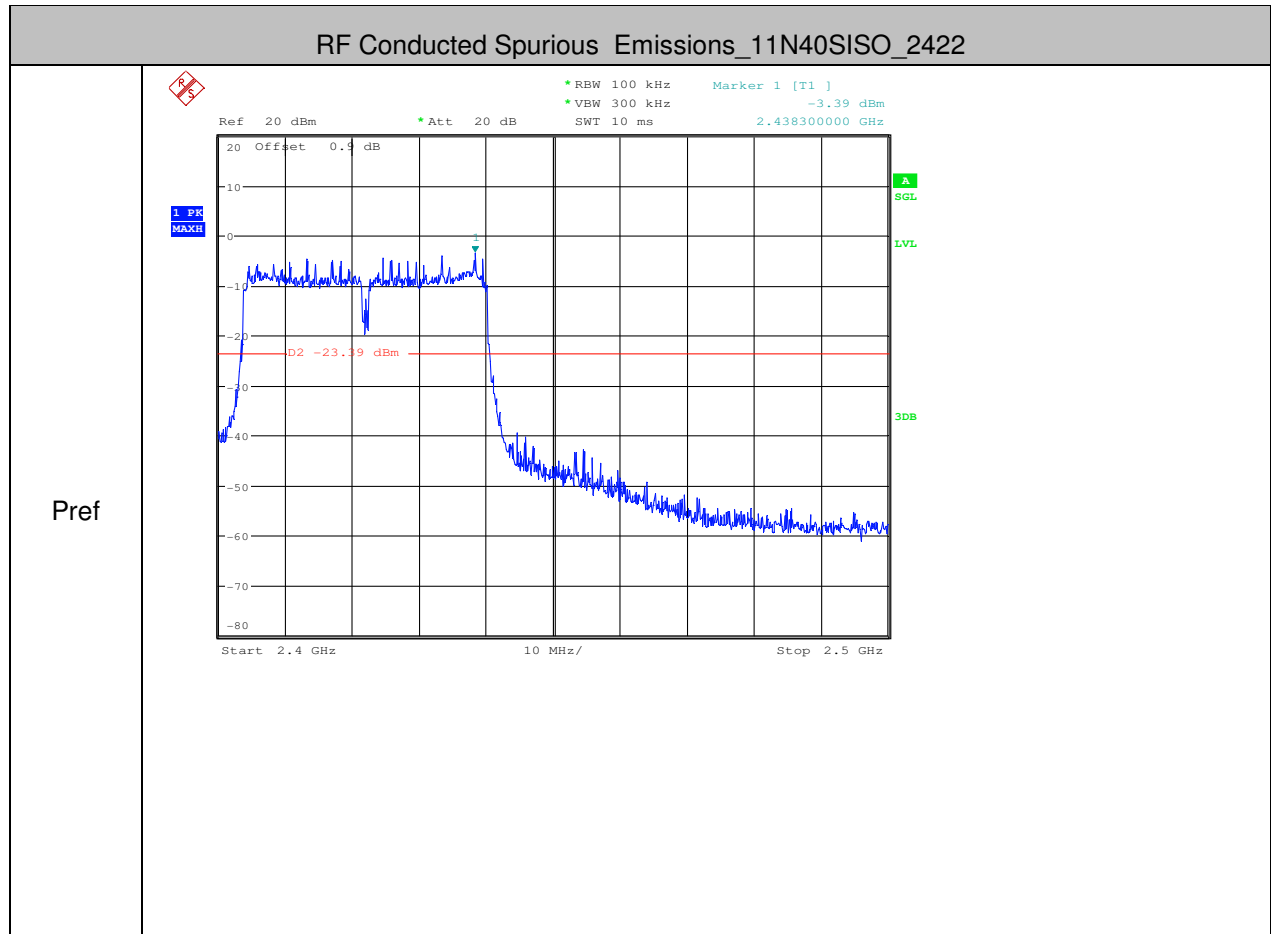


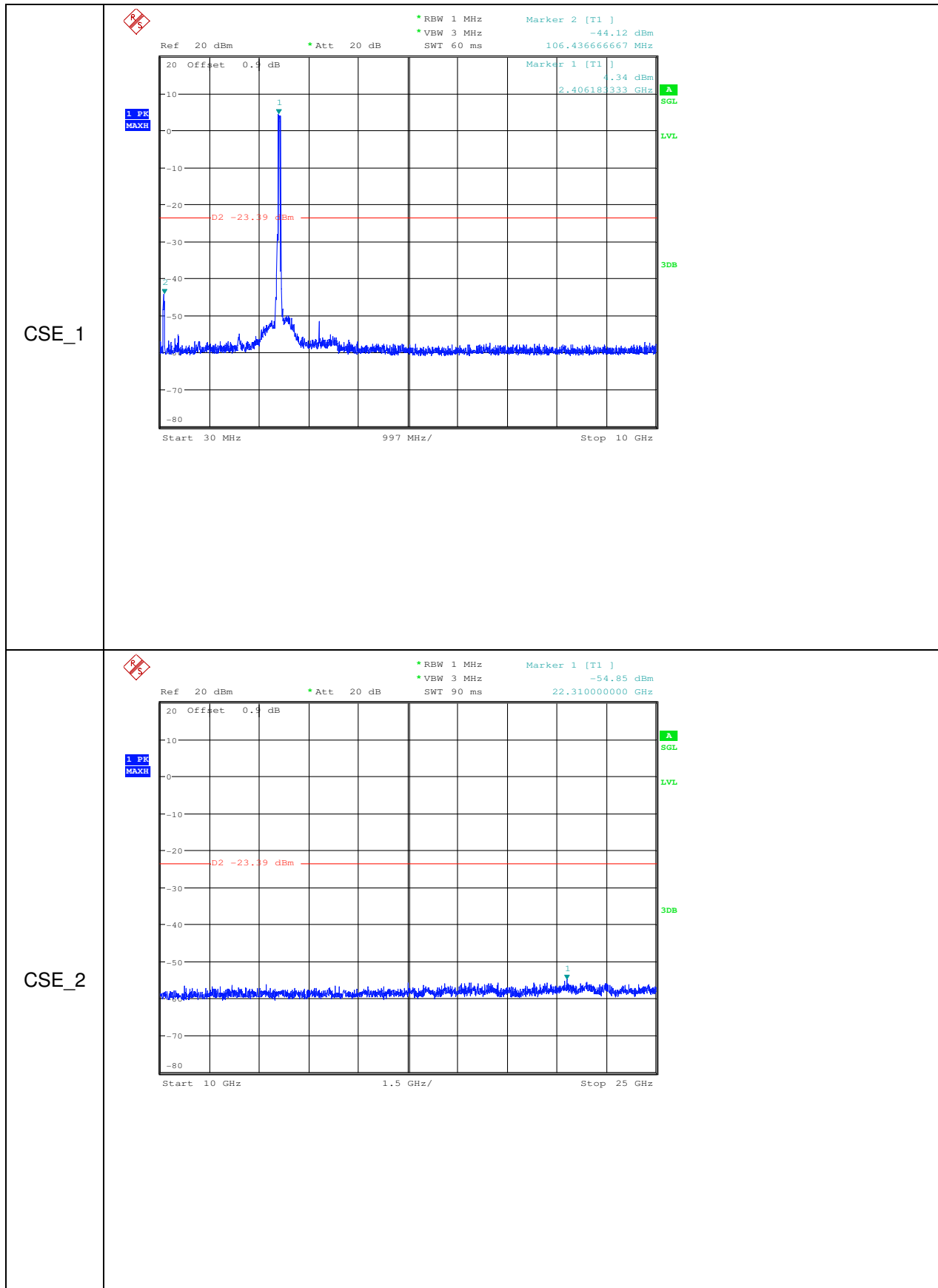


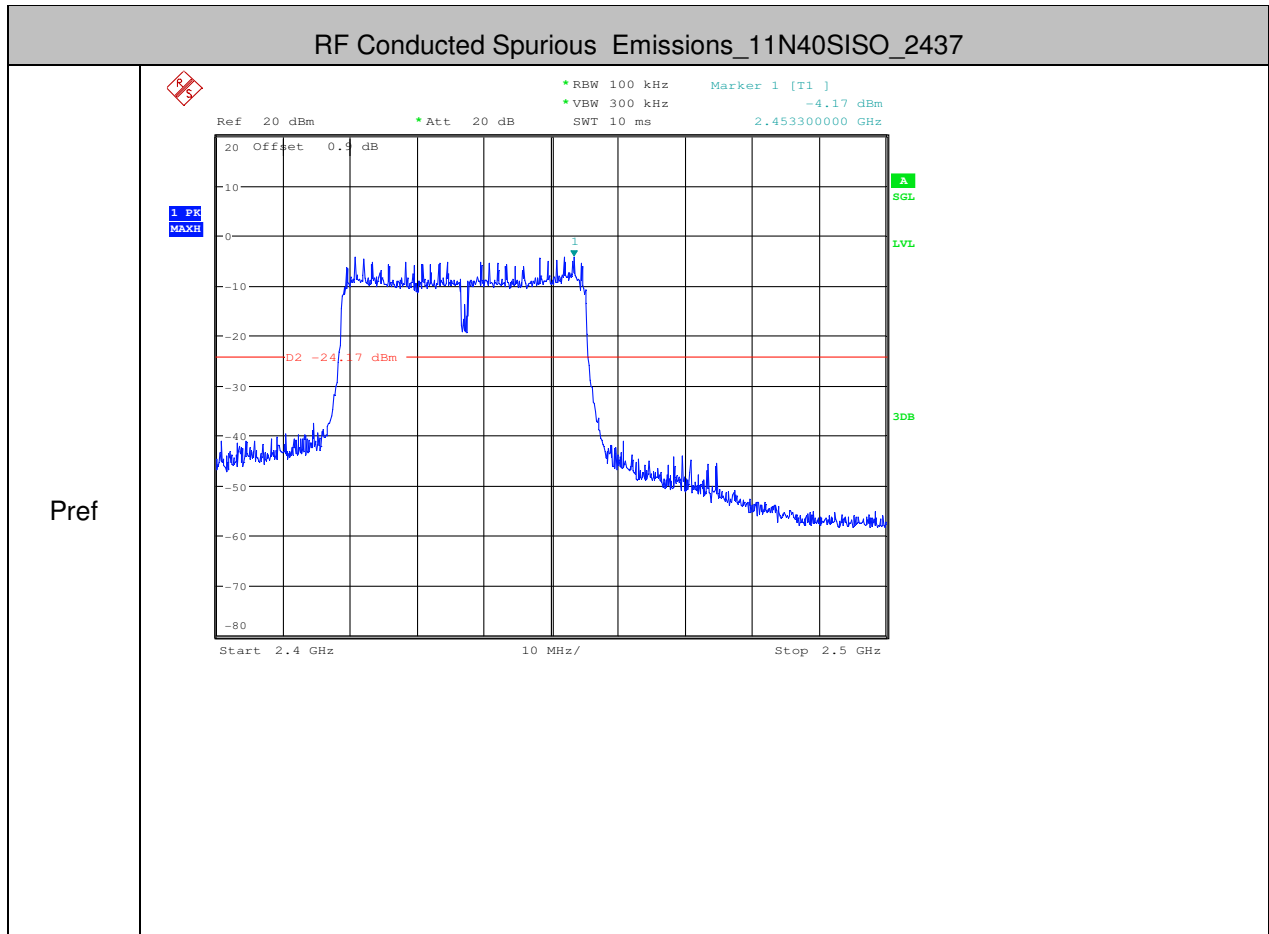


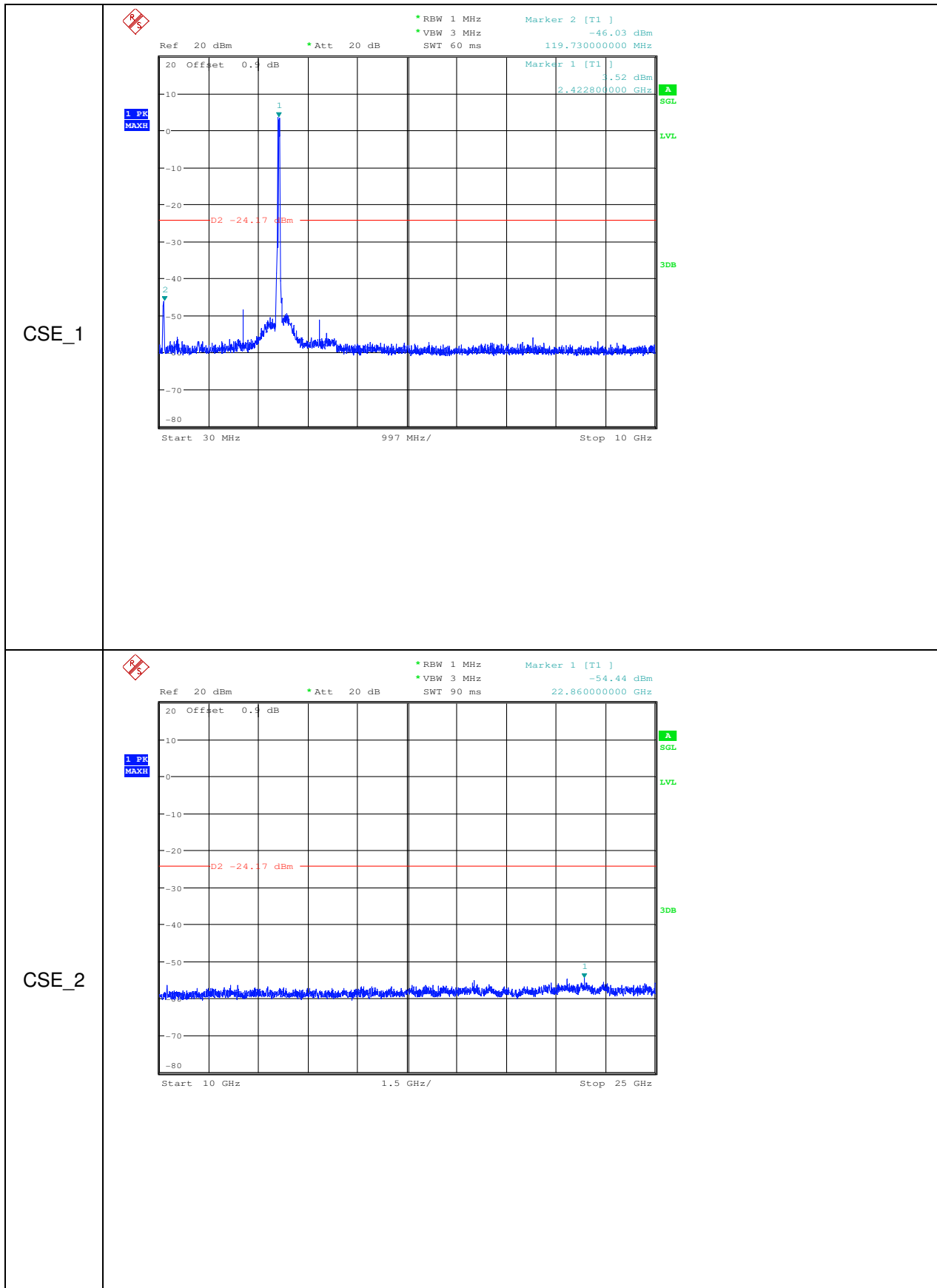


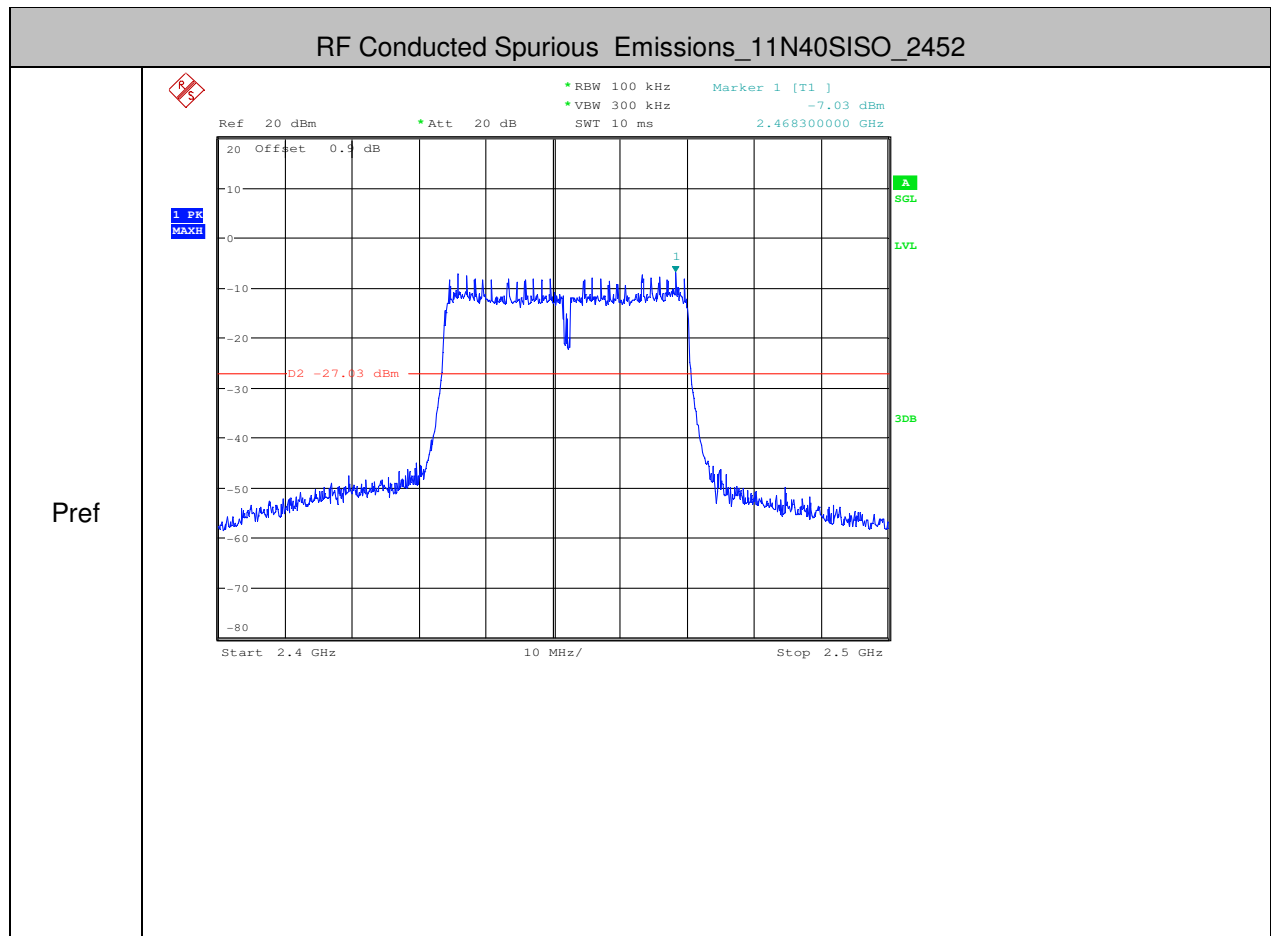






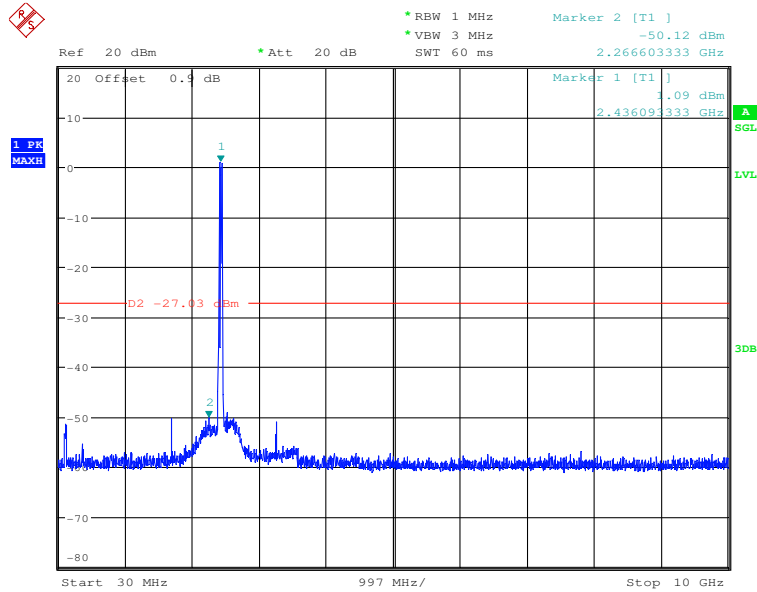








CSE_1



CSE_2

